ADDITIONS TO THE ACARINA—PARASITOIDEA OF AUSTRALIA

PART I

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[Read 13 August 1942]

Introduction

Hitherto only a few species of Acarina have been recorded from Australia as belonging to the family Parasitidae (Gamasidae) in the wide sense of Vitzthum (Handbuch der Zool. 1931).

In his "A Synopsis of Australian Acarina," Rec. Aust. Museum, 1916, **6**, (3), 173, Rainbow only lists one species, *Gamasus flavolimbatus* L. Koch, Verhandl. K. Zool. Ges., Wien, 1867, from Queensland, which might belong to this family. Unfortunately the original publication is not available to me, and as the species has not been recorded since, I am as yet unable to express any opinion as to its status.

In Trans. Roy. Soc. S. Aust., 1916, **40**, Banks described a number of Acari from ants' nests in Tasmania, collected by A. M. Lea, amongst which were three species referred to the genus *Parasitus* Latreille. These were *P. lyratus, P. disparatus* and *P. inversus.*, Of these species there are, in the South Australian Museum collections, mounted specimens labelled in Lea's handwriting as the first two species and therefore presumably mounted by him on their return from Banks. It has now been possible to remount these specimens for more critical examination with following results.

Parasitus lyratus, two females, although agreeing with Banks' description and figures in general are yet inaccurately drawn in many important details; they are not a *Parasitus* but belong to the genus *Hypoaspis*. of the Laelaptidae. *Parasitus disparatus,* six females, five of which do not agree with Banks' description and figures of this species, but do agree with those of *Parasitus inversus,* specimens of which, according to Lea's notes, were not returned to the South Australian Museum. They are also not a Parasitid but another species of *Hypoaspis.* The sixth specimen, however, may be *disparatus* insofar as it has clavate dorsal setae as figured by Banks, but the configuration of its ventral shields is again that of the genus *Hypoaspis.*

The species described by Banks 1916 as *Cyrtolaelaps femoralis* on re-examination of the material in the South Australian Museum and comparison with fresh material, proves to be a *Gamasiphis.*

In the present paper, the families as defined by Oudemans 1939 have been adopted and species belonging to the Parasitidae, Neoparasitidae, Gamasolaelaptidae, Pachylaelaptidae and Macrochelidae are recorded from Australia as follows:

Parasitidae—

Parasitus americanus Berl. 1888.
Pergamasus crassipes Latr. 1746 v. *australicus* nov.
,, ,, v. *longicornis* Berl. 1906
,, ? *barbarus* Berl. 1905

Neoparasitidae—

Hydrogamasus dentatus n. sp.
,, *relatus* n. sp.
,, *relictus* n. sp.
,, ,, v. *major* n. v.
,, *australicus* n. sp.
Gasmasiphis femoralis (Banks 1916)
Austrogamasus gracilipes (Banks 1916).

Gamasolaelaptidae—

? *Digamasellus concina* n. sp.
? ,, *punctatus* n. sp.
? ,, *trägärdhi* n. sp.

Pachylaelaptidae—

Pachylaelaps australicus n. sp.

Macrochelidae—

Macrocheles vagabundus Berl. v. *australis* Berl. 1918
,, *coprophila* n. sp.
Nothrholaspis ? montivagus Berl. 1887
Geholaspis sp.
Eucpicrius filamentosus n. g., n. sp.

Family PARASITIDAE Oudemans 1902

Tijdschrft v. Entom. 1902, **45**, 6.

Female epigynial shield triangular with a pointed, anteriorly directed apex, strongly chitinised, posterior margin straight or almost so, usually with a single pair of setae; sternal shield with three pairs of setae and consisting of the coalesced jugular and coxal shields; metasternal shield usually present and free; prae-endopodal shields free. Ventral and anal shields coalesced and, sometimes, partially so with the dorsal. Fork of palpal tarsus three-pronged.

Oudemans (Zool. Anz., **126**, 21, 1939) refers to this family only the genera *Amblygamasus* Berl. 1903, *Eugamasus* 1892, *Holoparasitus* Ouds. 1936 (= *Ologamasus* Berl. 1906 non 1888), *Parasitus* Latr. 1795 (= *Carpais* Latr. 1796 = *Gamasus* Latr. 1802), *Pergamasus* Berl. 1903, *Sessiluncus* G. Can 1898 and *Trachygamasus* Berl. 1906.

These genera may be separated by the following key.

Key to the Genera of Parasitidae

1 Claws of leg I sessile. Dorsal shield entire. Gen. *Sessiluncus* G. Can. 1898
Claws of all legs pedunculate. 2

2 Metasternal shields wanting or ? fused with sternal shield. Claws of leg I on a long 2-segmented peduncle. Dorsal shield divided by a fine suture.
Gen. *Trachygamasus* Berl. 1906
Metasternal shields distinct and separated from sternal shield. All claws on a simple peduncle. 3

3 Dorsal shield divided into two. 4
Dorsal shield entire. 5

4 Labial cornicles of ♂ with distinct basal segment. Gen. *Parasitus* Latr. 1795
Labial cornicles of ♂ sessile, without basal segment. Gen. *Eugamasus* Berl. 1892

5 Ventrianal shield posteriorly coalesced with dorsal.
Gen. *Holoparasitus* Oudms. 1936
(= *Ologamasus* Berl. 1906 non 1888)
Ventrianal shield entire, free from dorsal. 6

6 Leg II with practically unarmed femur; processes on genu and tibia backwardly directed.
Gen. *Amblygamasus* Berl. 1903
Leg II with strong femoral processes directed forwards.
Gen. *Pergamasus* Berl. 1903

Genus PARASITUS Latr. 1795

Mag. encyclop., **3**, (13), 19.
= *Gamasus* Latr. 1802 Sonnini's Buffon Ins., **3**, 64.

Shape a more or less clongate oval. Dorsal shield in both sexes divided by a line or narrow suture, well chitinised. Femur of leg II of male with a strongly developed calcar and a small axillary tubercle, genu and tibia also with processes. Movable chela of mandibles with a more or less fused calcar process. Labial cornicles with a distinct basal segment. Epistome three- or five-spined. Deutonymph with the dorsal shields well separated, posterior subtriangular. In female, prae-endopodal and metasternal shields separated, latter large and distinct. Claws on all legs on long simple peduncles.

PARASITUS AMERICANUS Berlese 1888

Gamasus americanus Berl. 1888, Acari austro-americani estr., 23; 1906, Redia, 3, fasc. 2, 138, tab. II, fig. 7, X, fig. 6, XV, fig. 2, 14.

(Fig 1, A-K)

Adult—Length to 1,000 μ (Berlese 1,120 μ), width 650 μ. Colour brownish-yellow with very fine mottling of brown spots. Shape elliptical oval, with slight shoulders. Dorsal shield covering the whole body, divided into two by a suture. Dorsal chaetotaxy as in fig. 1, A, the large scapular setae to 150 μ long and blunt-tipped, the longer dorsal blunt setae to 78 μ, the finer pointed setae to 65 μ.

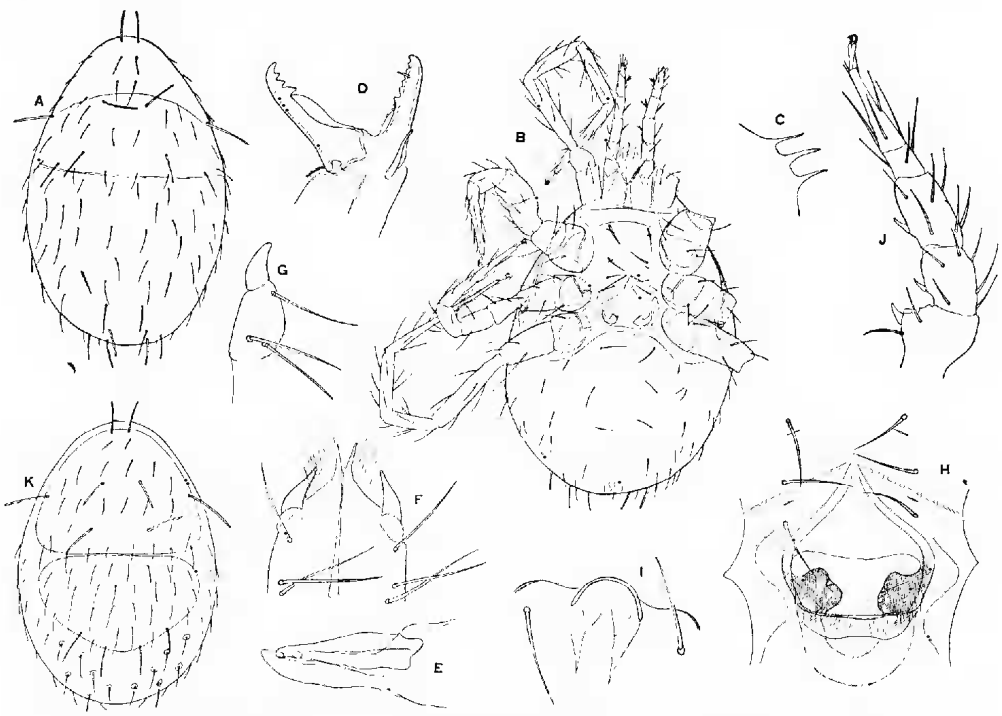

Fig 1, A-K *Parasitus americanus* Berl.: A, dorsum ♀; B, venter ♀; C, epistome ♀; D, mandible ♀; E, same ♂; F, labial cornicles ♀; G, labial cornicle ♂; H, epigyne ♀; I, genital foramen ♂; J, leg II ♂; K, deutonymph, dorsal.

Mandibles as figured, ♀ movable chela with four strong teeth in distal half, fixed chela with 7-9 smaller teeth; ♂ movable chela with the calcar process fused, apically with two blunt rounded teeth at the apex, fixed chela without distinct teeth. Epistome trispinous as in fig. 1 C, usually with the median prong bluntly

pointed but often apically truncate as figured by Berlese. Labial cornicles in ♂ with distinct basal segment.

Legs—♀, I and IV long and slender, 1,160 μ and 1,250 μ respectively, II and III shorter and thicker, 660 μ and 750 μ respectively, all legs unarmed; ♂, I and IV 1,085 μ and 1,170 μ respectively, II and III 750 μ and 780 μ respectively; leg II armed with processes as in fig. 1, J; jugular shields fused with the sternal shield. Peritreme long and slender. Genital opening of ♂ under the front edge of sternal shield; of ♀ as figured (fig. 1, H), epigynium apparently without setae; endogynium internally unarmed, posteriorly with a single transverse row of long fibrils. Anus small, posterior-ventral.

Deutonymph—Dorsally, as figured (fig. 1,K). Length 920 μ, width 580 μ. With anterior and posterior shields, posterior shield short, 335 μ long. Posterior of the second dorsal shield are twelve small ovoid platelets from which arise single setae, 52 μ long. Otherwise as in adult without sexual characters.

Loc.—A very common species occuring in manure and on cultivated ground, etc. Western Australia: Perth, August 1931 (H. W.), adult and nymph. South Australia: Glen Osmond, March 1933, August 1934; Mount Barker, June 1934; Long Gully, August 1938; Adelaide, July 1942.

Remarks—Originally described by Berlese from Paraguay, from female and nymph only, this species is probably almost cosmopolitan in agricultural areas.

Genus Pergamasus Berlese 1906

= *Gamasus* ex. p. auct., subgen. *Gamasus* ex. p. Berlese. Mesostigmata.
Pergamasus Berl. 1906, Redia, **3**, fasc. 1.

Parasitidae with the epigynial shield triangular and separated from the fused ventrianal shield; metasternal and parasternal shields well developed, former with one pair of hairs and one pair of pores. Prae-endopodal shields well developed and distinctly separated from the sternal shield. Jugular shields coalesced with sternal. Sternal shield with three pairs of setae and two pairs of pores. Endogynium various, armed or not with teeth, pockets and median process.

Legs generally long, especially I and IV, and all with long caruncle and a pair of claws; leg II of male on femur armed with prominent blunt processes.

Cuticle of shields with scale-like reticulations.

Pergamasus crassipes (L.) Latr.

Acarus crassipes L. 1746, Fauna Suec. 1969, *idem* 1735, Syst. nat., Ed. 1. Hermann 1804, Mem. Apt., tab. 3, fig. 6.
Acarus testudinarius Hermann 1804, Mem. Apt., tab. 9, fig. 1.
Gamasus quinquespinosus Kramer 1876, Gamasiden.
Gamasus (*Pergamasus*) *crassipes* Berl. 1884, A.M.S. it. Rept., fasc. 13, fig. 7, 8; 1906, Redia, **3**, fasc. 1, 229 tab. V. fig. 11, 18, VIII 9, XIII 5, XVIII 7.

var. **australicus** nov.

(Fig. 2, A-E)

Female—As in the typical form but differing in the detailed structure of the endogynium. Colour dark brownish-yellow. Length 1,170 μ, width 670 μ. Dorsal and ventral setae long, fine and pointed. Mandibles as in fig. 2 E. Epistome (fig. 2 B) five-spined, the median the longest and tapering rather suddenly for the posterior fourth. Palpi as in fig. 2 C. Endogynium with two large pockets with a median bifid process which sometimes appears asymmetrical or even simple; anterior walls of vagina with denticles. Epigynial shield with concave sides, so that it perceptibly narrows before the halfway.

Loc.—South Australia: Mount Barker, 24 June 1934, two spec. (H. W.); Glen Osmond, May 1935, one spec. (R. V. S.); National Park, Belair, January 1938 one spec., (H. W.).

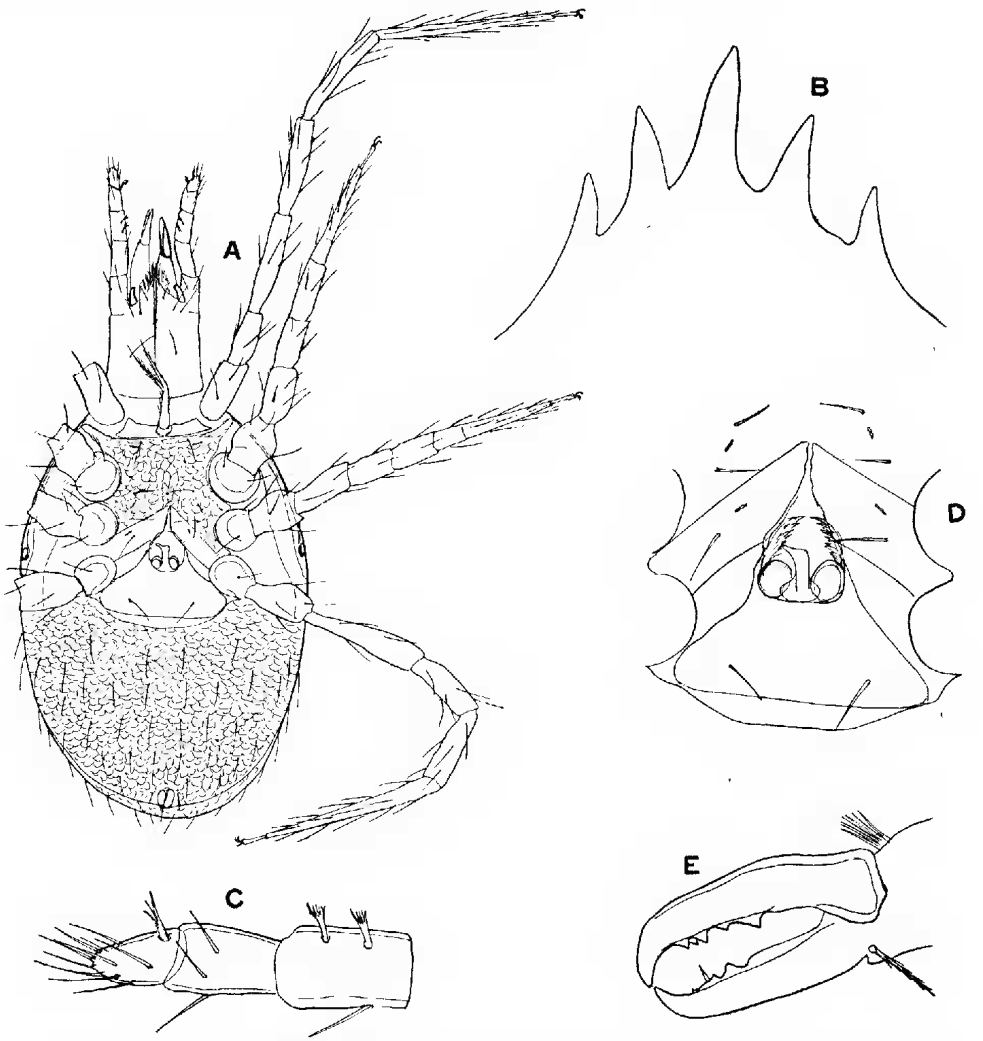

Fig. 2, A-E *Pergamasus crassipes* v. *australicus* n.v.: A, venter ♀; B, epistome ♀; C, tip of palp; D, epigyne and metasternal shields; E, mandible ♀.

Remarks—In the absence of males, the above specimens are referred with some uncertainty to a variety of the European *P. crassipes*, for Berlese gives several species with somewhat similar epigynial structures and epistomes. From the typical form it differs in the teeth on the wall of the vagina.

var. LONGICORNIS Berlese 1906

Redia, 3, fasc 1, 232.

(Fig. 3, A-I)

Length 1,670 μ, width 100 μ. Legs: ♀, I 2,170 μ, II 1,400 μ, III 1,420 μ, IV 2,100 μ; ♂, I 1,420 μ, II 900 μ, III 1,000 μ, IV 1,420 μ. Leg II of male with pronounced processes on femur and tibia as in fig. 3 H-I. Endogynium without pockets or teeth on vaginal wall but with a pair of blunt lobes. Epistoma with five short equal teeth.

Loc.—One male and one female from Hobart, Tasmania, July 1937 (J. W. E.); one female, Mount Gambier, South Australia, January 1941 (H. W.).

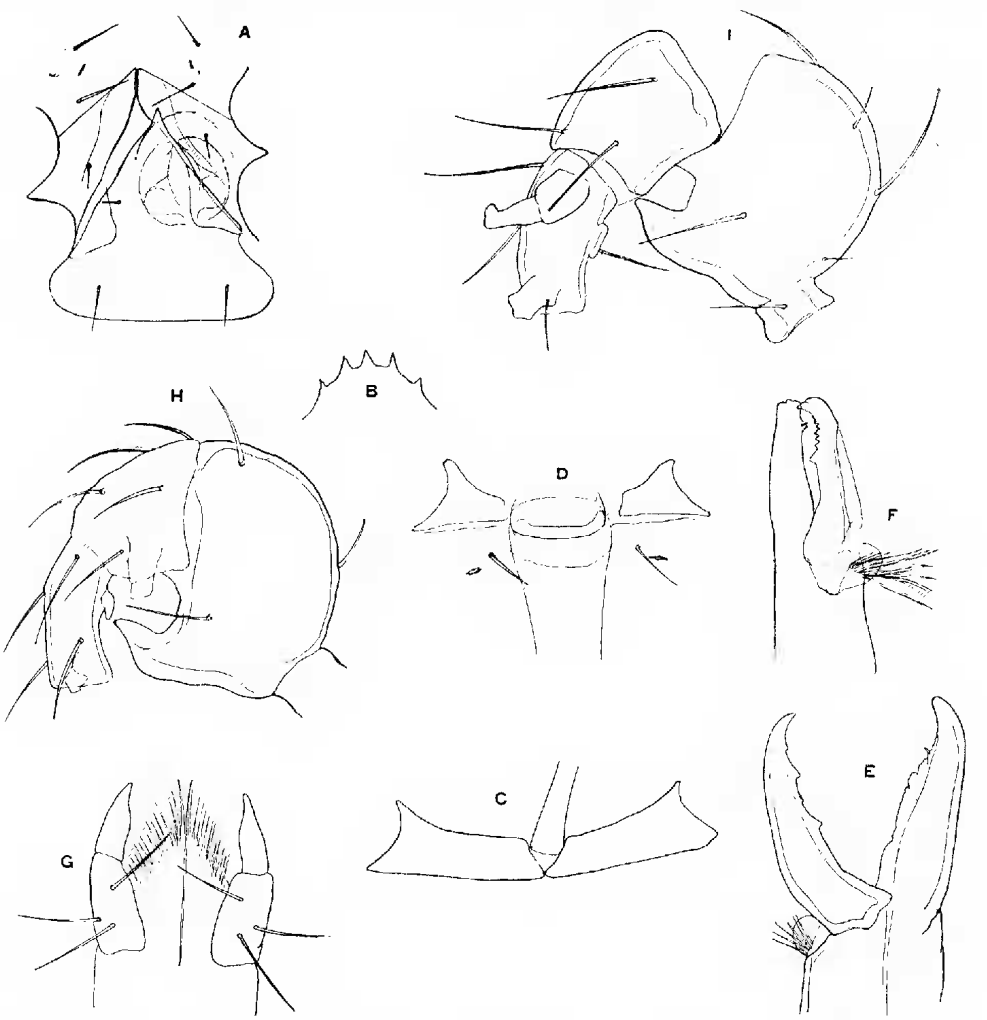

Fig. 3, A-I *Pergamasus crassipes* v. *longicornis* Berl.: A, epigyne and metasternal shields ♀; B, epistome ♀; C, prae-endopodal shields ♀; D, prae-endopodal shields and genital foramen ♂; E, mandible ♀; F, same ♂; G, labial cornicles ♂; H-I, leg II ♂.

Remarks—These specimens agree with Berlese's figure of the second leg of the male and in the endogynium with the figure given by Trägärdh (Entom. Tidskft. 3-4, 1938, 149).

PERGAMASUS ? BARBARUS Berlese

Acari nuovi Mater. pel. Manip., V, 1905; Redia, 1908, 2, fasc. 2, 233, 1905, 3, fasc. 1, 2, 5, tab. XV, fig. 1, 9.

(Fig. 4, A-C)

Large, brownish-yellow, well chitinised. Length 1,420 μ, width 920 μ. Legs I 1,420 μ II 920 μ, III 925 μ, IV 1,150 μ. Dorsal setae fine and to 80μ in length. The dorsal and ventral shields with fine reticulations. Epistome with five spines, the median of which is but little longer than the others (fig. 4 B). Prae-endopodal

shields as in fig. 4 A with almost parallel anterior and posterior margins. Sternal shield with three pairs of setae. Metasternal shields distinct with the usual pair of setae. Epigynial shield as in fig. 4 C. Endogynium with a pair of pockets with a short bifid process between. Vagina without any armature.

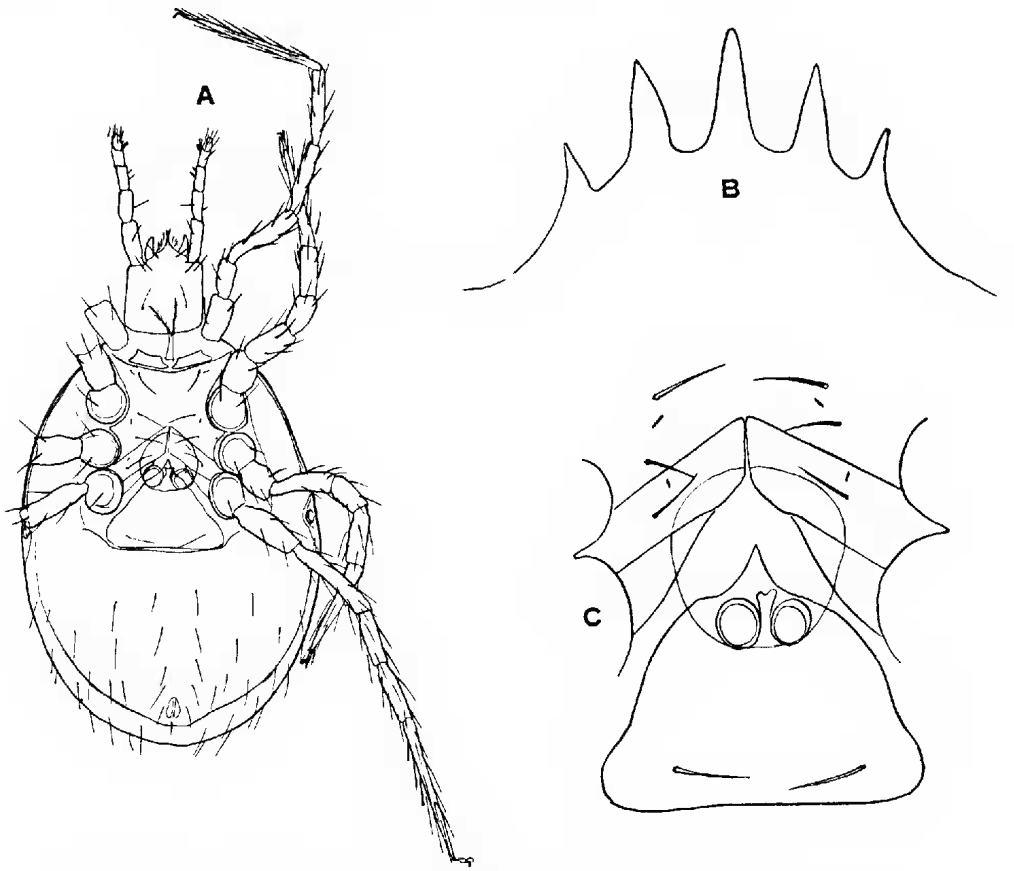

Fig. 4, A-C *Pergamasus ? barbarus* Berl.: A, venter ♀ ; B, epistome ♀ ; C, epigyne and metasternal shields ♀.

Loc.—A single female from moss, National Park, South Australia, January 1938 (H. W.).

Remarks—This specimen is referred to Berlese's species from Europe, mainly on comparison of the epigynium and epistome, as figured in his monograph of the genus "Gamasus" in Redia 1905.

Family NEOPARASITIDAE Oudemans 1939

Zool. Anz. 1939, **126**, (1-2), 21.

Fork of palpal tarsus three-pronged. Dorsal shield entire. Epigynium not triangular and not with anterior pointed apex, but gradually or suddenly extending into a membraneous edge which reaches the sternal or metasternal shields, posterior margin variously shaped.

In this family Oudemans (*loc. cit.*) includes the genera *Beaurieuia* Ouds. 1929, *Epicriopsis* Berl. 1916, *Gamasiphis* Berl. 1904, *Hydrogamasus* Berl. 1892, *Megaliphis* Willm. 1937, *Neoparasitus* Oudms. 1901, *Ologamasus* Berl. 1888 (= *Ologamasellus* Berl. 1914), *Poecilochirus* G. and R. Can. 1882 and *Sphaeroseius*.

Genus Hydrogamasus Berlese 1892

A.M.S. it. Rept., fasc. 68, fig. 5 (type *Gamasus littoralis* G. & R. Can. 1885 = *G. salinus* Laboulbene 1851).

Neoparasitidae with the dorsal shield entire in adults of both sexes. Ventral, in ♀ the sternal shield has four pairs of setae, *i.e.*, it consists of the coalesced jugular, coxal and metasternal shields, and is also fused with the first, second and third endopodal shields; the prae-endopodal and fourth endopodal shields are free; epigynium free from the sternal and fused ventrianal shields, with one pair of setae and rounded anterior margin: in ♂ the sternal shield has five pairs of setae and is separated by a suture line from the ventrianal; the prae-endopodal shields are free, the jugular, first, second and third endopodal and metasternal fused with it; the ventrianal shield fused with the dorsal shield; the genital orifice is under the anterior margin of the sternal shield. Epistome triangular with a mucronal apex or with a single long median mucro. Mandibles in ♂ with a free, slender or stouter process on the movable chelae. All legs with caruncle and claws, leg II of male thicker than the others and with process on the femur, and sometimes on genu, tibia or tarsus.

Hydrogamasus dentatus n. sp.

(Fig. 5, A-O)

Female—Length 750 μ, width 420 μ. Dorsal shield strongly chitinised with fine reticulations which posteriorly resemble scaling; dorsal setae fine, anteriorly 65 μ long, increasing to 110 μ posteriorly. Epistoma as in fig. 5 B, with a median mucro somewhat longer than depth of base and apically tridentate with the median tooth about one-fourth the length of mucro, base with sides almost straight at 45° and with 6-8 fine short teeth. Mandibles as in fig. 5 G; movable chela with three inner teeth, fixed chela with five teeth, two small ones after the fairly long "pilus dentarius" and three stronger ones before it. Labial cornicles as in fig. 5 I. Palpi as in fig. 5 D, the second segment with a strong ciliated seta and third segment with a spathulate sensory seta as well as a ciliated seta which is somewhat longer than the one on the previous segment, remaining setae simple; sensory fork on tarsus three-pronged, the inner prong shorter than the others. The prae-endopodal shields as in fig. 5 H, with the inner end acutely angular, anterior margins almost straight and outwardly diverging. Sternal shield reaching to posterior edge of coxae III, the apex of the anterior arms split off by a suture (fig. 5 H); the first and fourth pairs of setae corresponding to the fused jugularia and metasternalia are much finer than the second and third pairs. Epigynial shield separated from the sternal and ventrianal, with the pair of setae situated in the postero-lateral angles. Ventral and anal plates fused, large, with the anterior margin almost straight and extending to the outer margins of coxae IV, lateral and posterior margins rounded (fig. 5 A), with 12 fine setae in addition to the two adanal and one postanal setae. Between the anterior margin of the ventrianal plate and coxae IV are two pairs of minute inguinal plates, one at the extreme outer corner of the ventral plate, the other close in to the postero-lateral corners of the genital plate. Legs: I 750 μ, II 400 μ, III 500 μ, IV 750 μ; II stouter than the rest; claws small and caruncle short; trochanter of IV with a long anterior process on posterior edge, and a short one on anterior edge; trochanter III without such processes (fig. 5 K); tarsi about eight times longer than wide at the base.

Male—Dimensions as in female. Epistome, prae-endopodal and dorsal shields as in female. Ventrianal shield fused with the dorsal shield. Sternal shield with five pairs of setae, all of which are rather short, fine and uniform. Mandibles as in fig. 5-F, movable chela with a single large median tooth and strong stout curved

calcar process which is only fused basally and reaches almost to tip of chela; fixed chela with three teeth, the basal one very blunt and flattened. Palpi as in female, but second segment on the inner apical angle with a stout pitted sensory peg. Labial cornicles pedunculate, not sessile as in female. Legs: II much stouter than the rest; femur with a stout apophysis and a small axillary tubule, genu inwardly with a short flat process, tibia on inside with a stout forwardly directed spine-like process. Trochanter IV as in female.

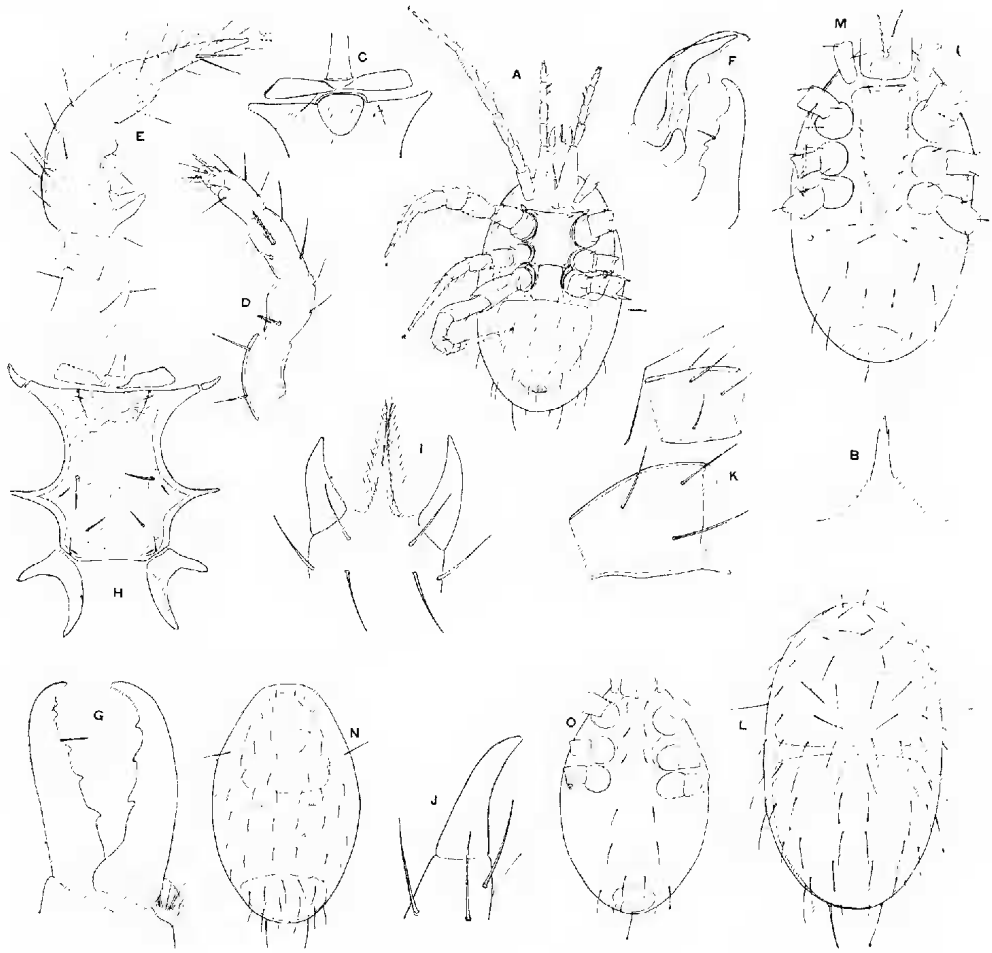

Fig. 5, A-O *Hydrogamasus dentatus* n. sp.: A, venter ♀; B, epistome ♀; C, prae-endopodal shields and ♂ genital foramen; D, palp ♂; E, leg II ♂; F, male mandible; G, same ♀; H, prae-endopodal and sternal shields ♀; I, labial cornicles ♀; J, same ♂; K, trochanters III and IV ♀; L, deutonymph, dorsal; M, same ventral; N, protonymph, dorsal; O, same, ventral.

Deutonymph—Length 105 μ, width 58 μ. Dorsally with two plates as in fig. 5 L. Ventrally (fig. 5 M) with the prae-endopodal shields only just indicated, sternal plate reaching to just past coxae IV, slightly tapering to coxae III, thence more abruptly, with four pairs of setae. Behind coxae IV lies a transverse row of eight small plates, the extreme ones being roughly triangular, the others elongate and narrow. Anal plate small, wider than long. There are 12 setae on the venter, with another pair between the coxae IV and the apex of the sternal plate. Peritreme only reaching to coxae II.

Protonymph—Length 65 μ, width 39 μ. Dorsal plates two as in fig. 5 N, widely separated, with two pairs of small accessory plates in between. Ventrally (fig. 5 O) sternal plate with three pairs of hairs. Anal plate smaller than in deutonymph. Venter with only eight hairs.

Loc.—Common in moss from the Mount Lofty Ranges, Belair, Long Gully, Waterfall Gully, South Australia in August and September 1938. Also one specimen from moss from Brisbane, October 1934.

Hydrogamasus relatus n. sp.

(Fig. 6, A-M)

Female—Length 670 μ, width 335 μ. Dorsal shield strongly chitinised with fine reticulate lines; dorsal setae fine, uniformly 40 μ long. Epistome as in fig. 6 G, H, with a simple median mucro, sides of base almost horizontal, with some fine teeth. Mandibles (fig. 6 B): movable chela with three teeth, fixed chela with four teeth. Labial cornicles sessile (fig. 6, E). Palpi as in *H. dentatus*. Prae-endopodal shields as in fig. 6 M. Sternal shield as in fig. 6 M, the second and third pairs of setae longer and stronger than the first and fourth pairs (apical portion of anterior lobes, and fourth endopodal shield not shown). Legs: I 580 μ long, II 420 μ, III 420 μ, IV 500 μ; II and IV somewhat thicker than I and III;

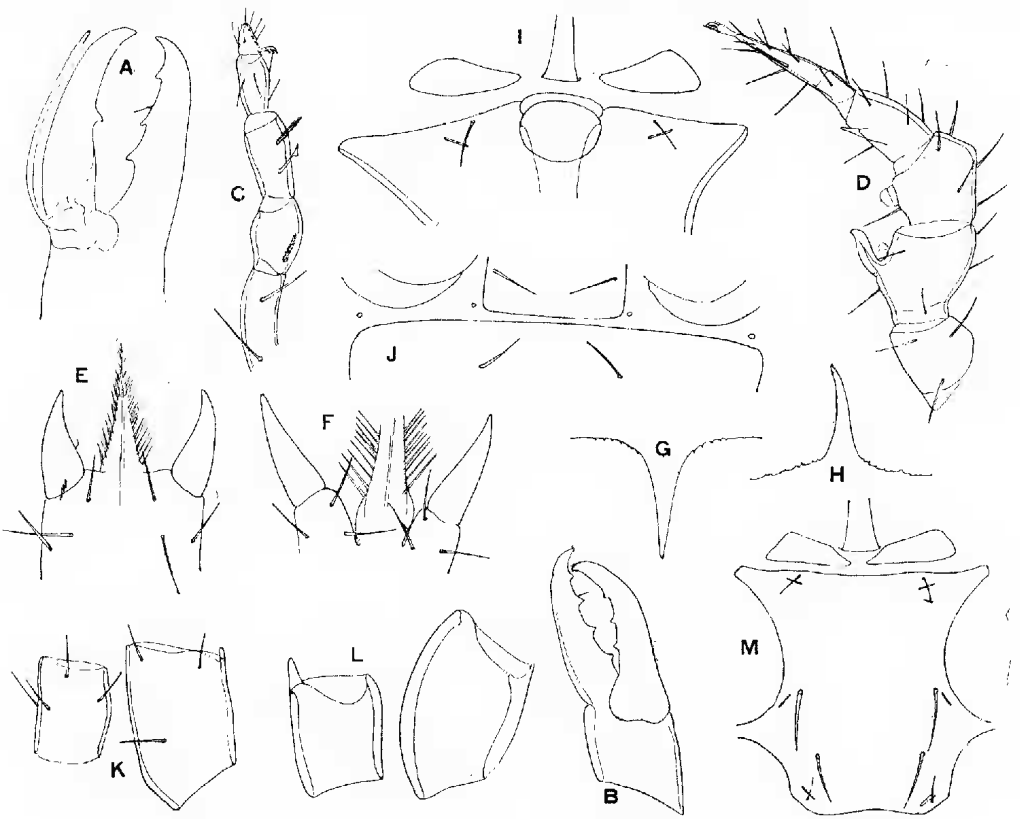

Fig. 6, A-M *Hydrogamasus relatus* n. sp.: A, mandible ♂; B, same ♀; C, palp ♂; D, leg II ♂; E, labial cornicles ♀; F, same ♂; G, H, epistome; I, prae-endopodal shields and male genital foramen; J, apex of ventrianal and base of epigynial shields ♀, showing inguinalia; K, trochanter III and IV ♂; L, same ♀; M, sternal shield ♀.

trochanter IV at most with indistinct posterior spine-like process; trochanter III with longer tooth. The outer inguinal plates situated within the outer corners of the ventrianal shield.

Male—As in female and in male of *H. dentatus*. Mandibles: process of movable chela long and slender and reaching tip of chela which has only a single median tooth; fixed chela with three teeth. Palpi apparently without the sensory apical peg. Labial cornicles pedunculate. Legs: II with a strong apophysis and an axial knob on the femur, an inner boss on the genu and an inner blunt spine-like process on tibia; trochanters without pronounced teeth.

Loc.—Glen Osmond, South Australia, in moss, June and July 1934 (three ♀ ♀, one ♂).

Hydrogamasus relictus n. sp.

(Fig. 7, A-L)

Female—Length 750 μ, width 370 μ. Not so heavily chitinised as in preceding species, with usual reticulations on the dorsal and ventral shields; dorsal setae anteriorly 40 μ long, increasing to 65 μ posteriorly. Epistome with simple median mucro, with sides of base at an angle of about 45° and with fine serrations. Mandibles (fig. 7 G): movable chela with three teeth, fixed chela with five teeth.

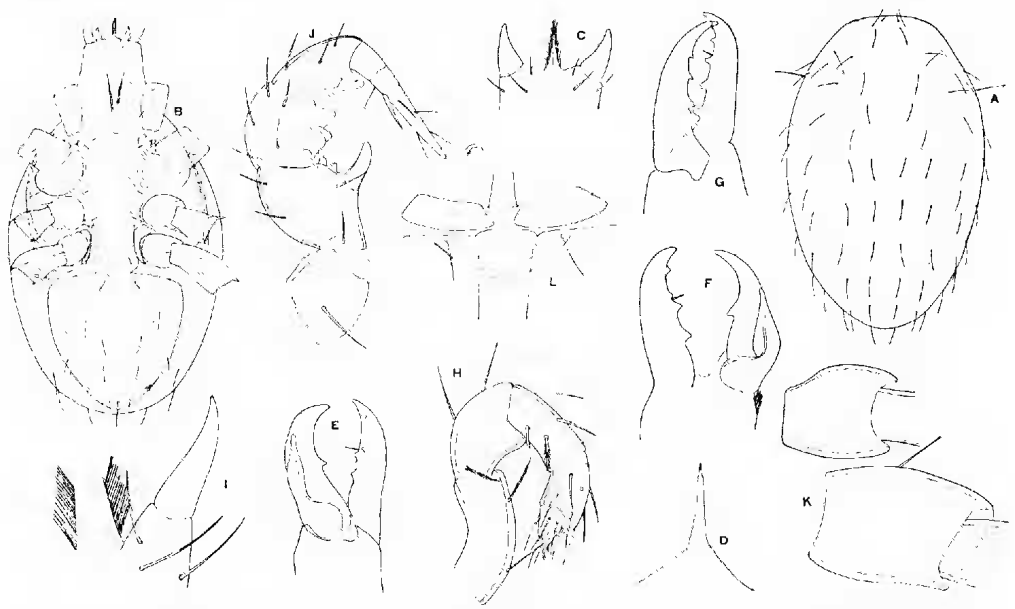

Fig. 7. A-L *Hydrogamasus relictus* n. sp.: A, dorsal ♀; B, venter ♀; C, labial cornicles ♀; D, epistome ♀; E, mandibles ♂; F, same, another view; G, same ♀; H, palpi ♂; I, labial cornicle ♂; J, leg II ♂; K, trochanters III and IV ♀; L, prae-endopodal shields and ♂ genital foramen.

Labial cornicles (fig. 7 C) sessile. Palpi as in preceding species. Prae-endopodal shields as in fig. 7 B, anterior and posterior margins almost parallel. Sternal shield as in fig. 7 B, the second and third pairs of setae only slightly stronger than first and second pairs. Legs: I 585 μ, II 420 μ, III 370 μ, IV 550 μ; II and IV somewhat stouter than I and III; trochanters III and IV without any pronounced apical teeth. Outer inguinal shields within the antero-lateral corners of ventrianal shield.

Male—Dimensions generally as in female and general features as in *H. dentatus* ♂. Mandibles: process of movable chela short, only two-thirds length

of chela and much bent and stout; fixed chela with only a single median tooth, movable chela with two small and two large teeth (fig. 7 E, F). Palpi apparently without the apical sensory cone of *H. dentatus*. Labial cornicles pedunculate. Legs: lengths approximately as in female, II with strong curved apophysis and two axillary lobes on femur, two large lobe-like protuberances on genu, and inner stout spine on tibia; trochanters without pronounced teeth.

Loc.—Queensland: in moss, Brisbane, October 1934. South Australia: in moss, Adelaide, 1935; Glen Osmond, in pine needles, 1935.

var. **major** n. v.

Differing from the typical form only in the size. Female: length 1,000 μ, width 500 μ; dorsal setae 55 μ to 115 μ; legs I 835 μ, II 635 μ, III 520 μ. IV 920 μ.

Loc.—Victoria: Sassafras, December 1931, in moss, 1 ♀ (H. G. A.). New Zealand: Bourke's Bush, Waimamaku, Auckland, October 1938, two ♀ ♀ (E. D. P.).

Hydrogamasus australicus n. sp.

(Fig. 8, A-R)

Female—Length 835 μ, width 470 μ. Shape ovoid but posterior half more tapering than in preceding species. Usual fine reticulations on dorsal and ventral shields. Dorsal setae 48-50 μ long, fine. Epistome with a median mucro which is only faintly tridentate apically, sides of base concave with at most indistinct crenulations. Mandibles as in fig. 8 G, movable chela with three teeth, fixed chela with two small teeth in front of "pilus dentarius" and three strong ones behind. Labial cornicles sessile. Palpi as in preceding species. Prae-endopodal shields as in fig. 8 B with almost parallel anterior and posterior margins. Sternal shield (fig. 8 B) with four pairs of setae, second and third pairs stronger than first and fourth pairs, apices of anterior arms separated. Legs: I 800 μ, II 600 μ, III 550 μ, IV 750 μ long, II and IV stouter than I and III; trochanters III with a posterior apical lobe-like tooth, IV with a short anterior apical tooth. Lateral inguinal plates well outside of the antero-lateral corners of the ventrianal shield (fig. 8 B).

Male—Size and dimensions as in female, and general features as in *H. dentatus*. Mandibles: process of movable chela stout and much bent over the correspondingly bent chela, movable chela with one tooth; fixed chela with three teeth (fig. 8 H). Palpi on the second segment without the apical peg of *H. dentatus*. Labial cornicles pedunculate. Legs: lengths approximately as in female, II with strong blunt process and a special seta on the inner apical angle, but no axillary tubercles on femur, genu with two short blunt processes, and the usual spine on the tibia (fig. 8 N); trochanters without pronounced teeth.

Deutonymph—Length 700 μ, width 420 μ. Dorsally with two shields as in fig. 8 Q. Ventrally with the prae-endopodal shields not in evidence; sternal shield reaching posterior margin of coxae IV, sides tapering from between coxae II and III, with four pairs of setae. Behind coxae IV laterally are a pair of small disc-like plates. Anal plate small, somewhat quadrate. There are eight pairs of setae on the venter with another pair between apex of sternal shield and coxae IV. Peritreme only reaching to coxae II.

Loc.—Queensland: Brisbane, in moss, October 1934, three ♂ ♂, two ♀ ♀, one deutonymph.

The above species of *Hydrogamasus* are all very closely related, differing only in minute details. They may be separated by the following key, which for comparison includes the Antarctic species *H. antarcticus* Trägärdh.

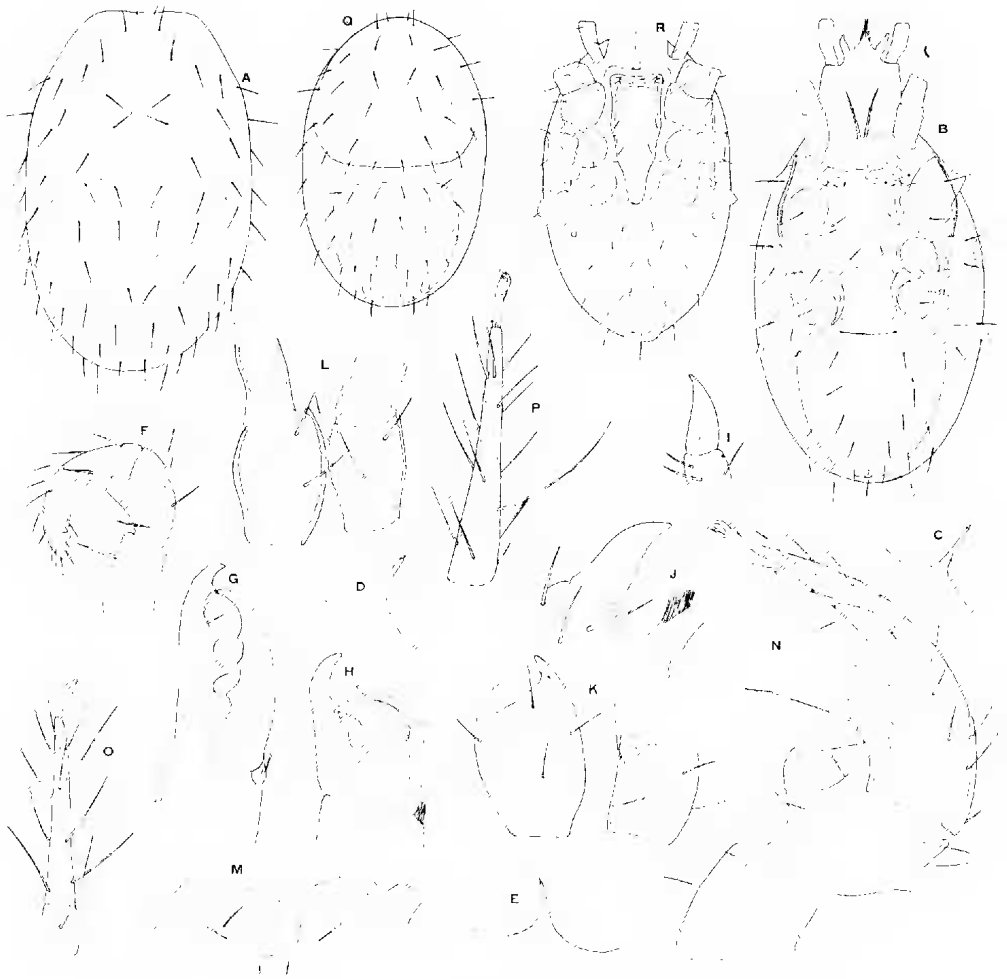

Fig. 8, A-R *Hydrogamasus australicus* n. sp.: A, dorsum ♀; B, venter ♀; C, epistome ♀; D, E, epistome ♂; F, palp ♂; G, mandible ♀; H, same ♂; I, labial cornicle ♂; J, same ♀; K, trochanters III and IV ♀; L, same ♂; M, prae-endopodal shields and male genital foramen; N, leg II ♂; O, tarsus leg III; P, same, leg IV; Q, deutonymph, dorsal; R, same, ventral.

Key to the Antarcticus Group of the Genus Hydrogamusus

♂ ♂

1 Tarsus of second leg with an outer short blunt process near the base. Movable chela of mandibles with one tooth, and long slender process; fixed chela with 2 teeth. Epistome triangular with median mucro nearly half the length, edges laterally with about 10 small teeth. *H. antarcticus* Trägdh.
Tarsus of second leg without process. Epistome not such a triangle, median mucro longer. 2

2 Process on movable chela of mandible long and slender, parallel-sided, and reaching tip of chela. Movable mandibular chela with 1 tooth, fixed chela with 3 teeth. *H. relatus* n. sp.
Process of movable chela of mandibles stouter. 3

3 Chelae of mandibles subequal in length. 4
Movable chela of mandibles much shorter than fixed; process as long as, and overlapping chela; movable chela with 1 tooth, fixed chela with 3 teeth. *H. australicus* n. sp.

4 Process of movable chela only two-thirds length of chela; movable chela with 1 tooth, fixed chela with 2 small teeth in front of "pilus dentarius," and two equally small teeth behind. *H. relictus* n. sp.

Process of movable chela reaching almost tip of chela: movable chela with 1 tooth, fixed chela with 3 large teeth. *H. dentatus* n. sp.

♀ ♀

1 Trochanter IV with prominent posterior apical tooth. Mucro of epistome apically tridentate, as long as base. base with sides finely toothed and forming an angle of 45°; movable chela of mandibles with 3 teeth, fixed chela with 5 teeth. *H. dentatus* n. sp.

Trochanter IV at most with indistinct posterior teeth. 2

2 All trochanters without distinct apical teeth. 3

Trochanter III with either an apical anterior tooth, or an apical posterior blade-like tooth. 5

3 Mucro of epistome about half the height of epistome and its sides almost in line with the sides of base, which in the distal half have 8-10 small teeth. *H. antarcticus* Trägärdh

Mucro about three-fourths length of epistome, its sides forming a distinct angle with the sides of the base; apically the sides of mucro have a minute tooth, and the sides of the base only very fine serrations. 4

4 Length to 750 μ. *H. relictus* n. sp.

length to 1,000 μ. *H. relictus* v. *major* n. v.

5 Trochanter III with an anterior apical blunt tooth. Lateral inguinalia within the angle of the ventrianal shield. *H. relatus* n. sp.

Trochanter III with a posterior blade-like apical tooth. Lateral inguinalia outside of the angle of the ventrianal shield. *H. australicus* n. sp.

Vitzthum 1929 (Tierwelt Mitteleuropas, Bd. III, Acari, 17) in his key to the Parasitidae defines the genus *Hydrogamasus* as follows: "Rückenschild einheitlich, auch bei den Jügendstadien, ohne seitliche Einschnitte." Halbert 1920 (Proc. Roy. Irish Acad., 35, B7), however, has shown that in the deutonymph and protonymph stages of *H. littoralis* G. & R. Can. (= *salinus* Laboulbene) there are two dorsal shields present. Similarly, I have described and figured (Aust. Antarct. Exped. Sci. Repts., vol. x, pt. 6, 1937) the deutonymph of *H. antarcticus* Trägdh. from Macquarie Island with two dorsal shields, and in the present paper the deutonymph and protonymph of *H. dentatus* and deutonymph of *H. australicus* are also shown to have two dorsal shields. According to the figures of *H. littoralis* (Berlese, Redia, fasc. 68, No. 5, 6) the jugularia (prae-endopodal shields of Trägärdh. Arkv. f. Zool, 7, No. 28, 20, 1912) consist of two pairs of small plates, none of which bear setae, and are therefore not true jugularia in Trägärdh's sense. Similarly, Berlese, in describing *H. silvestrii* (Zool. Anz., 1904, 27, 28), refers to the two pairs of jugularia (prae-endopodal shields) of both *H. littoralis* and *H. giardi* (Berl. et Troues.). In all the species described since *littoralis* and *giardi*, only a single pair of prae-endopodal shields occurs. This difference alone seems to suggest that these later species should constitute at least a new subgenus. In addition, the epistome of *H. littoralis* is triangular with three teeth, the median of which does not form a distinct mucro as in the group of species of which *antarcticus* may be taken as typical.

Hydrogamasus silvestri Berl. 1904, from Italia, is also unique amongst the known species of this genus in the unusual and more complicated structure of the epigynium and should probably have a new genus erected for it.

Genus Gamasiphis Berlese 1904

Acari nuovi, Maniplus 2, in Redia, vol. i, fasc. 2, 1903, 261 (Genotype *G. pulchellus* Berlese); Trägärdh 1907, Swedish South Polar Exped., Bd. v. Liefg. II, Acari, 10.

Neoparasitidae with the dorsal shield entire in both sexes. Female with the ventrianal shield posteriorly coalesced with the underlapping dorsal shield; sternal shield with four pairs of setae, *i.e.*, consisting of the fused jugular, coxal and metasternal shields, the third pair of sternal setae situated much nearer the median line than the others, fourth endopodal shields free; epigynium with rounded anterior margin fitting under the posterior margin of sternal shield, with one pair of posterior setae; ventrianal shield large, separated from the epigynium and from the dorsal shield for about four-fifths of its length by a gradually narrowing suture; peritremal shields coalesced with the parapodial shields which extend well beyond coxae IV; in the angle between ventrianal, epigynial and parapodial shields is a conspicuous round shield. Prae-endopodal shields a single pair in both sexes. Male with the ventrianal shield separated from the sternal by a thin suture; sternal shield with five pairs of setae, all four endopodal plates fused with it; ventrianal separated from parapodial shields by a narrow suture and from dorsal shield for four-fifths of its length by a gradually narrowing suture, or the ventrianal entirely fused with the epigynial and dorsal shields; mandibles with a strong but free process on the movable chela; femur of leg II with a strong curved apophysis. Epistome in both sexes with long median mucro and two short lateral teeth.

Gamasiphis femoralis (Banks 1916)

Cyrtolaelaps femoralis Banks 1916, Trans. Roy. Soc. S. Aust., xl, 228.

(Fig. 9, A-K)

Colour yellowish-brown. Shape oval, rounded behind.

Female—Length to 835 μ, width 500 μ. Epistome with long stout median mucro and two lateral mucrones about one-quarter length of median. Mandibles (fig. 9,F): movable chela with three blunt rounded teeth in front of "pilus dentarius" and three large rounded teeth behind. Prae-endopodal shields strongly chitinised anteriorly and posteriorly but the intermediate horizontal strip membraneous, suggesting the division into two shields. Sensory organ on palp III as in fig. 9, K. Ventrianal shield with twelve setae, short and fine, in addition to the adanal and postanal setae. Legs: I 665 μ, II 500 μ, III 420 μ, IV 635 μ; all tarsi with short caruncles and claws.

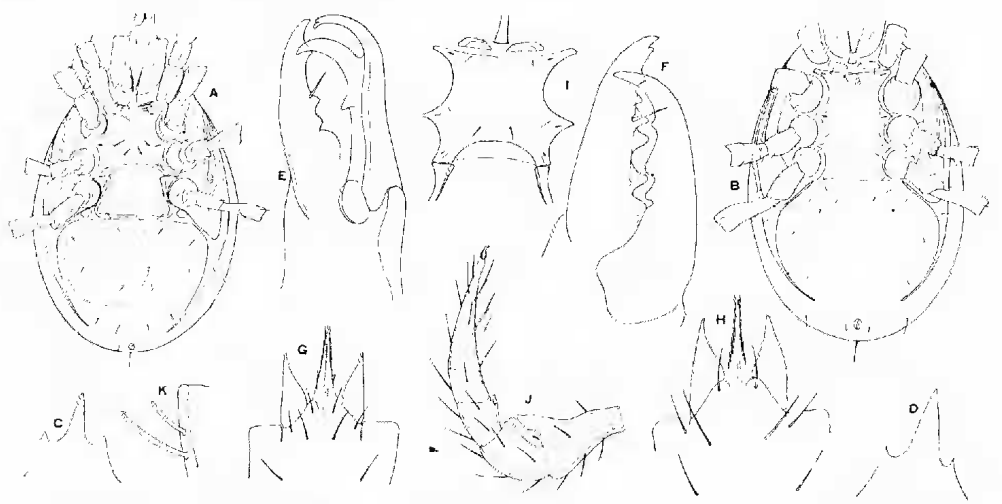

Fig. 9, A-K *Gamasiphis femoralis* (Banks): A, venter ♂; B, venter ♀; C, epistome ♂; D, same ♀; E, mandible; F, same ♀; G, labial cornicles ♀; H, same ♂; I, prae-endopodal and sternal shields ♀; J, leg II ♂; K, palpal fork.

Male—As in female, length to 750 μ, width 470 μ. Epistome as in female. Mandibles (fig. 9, E): movable chela strongly curved in apical half, with one median blunt tooth, and with strong calcar process apparently fused for basal two-thirds then free and following curve of chela, and at the extreme tip bifurcate; fixed chela with one tooth beyond "pilus dentarius" and two behind. Ventrianal shield separated from dorsal shield for almost the same distance as in the female. Prae-endopodal shields as in female. Legs: lengths as in female, II with a stout apical inner process on femur, a similarly placed small blunt lobe on genu, and a small tooth on tibia. Dorsal setae in both sexes 60-80 μ long, fine, but apically with a pair of setae 120 μ long.

Loc.—Tasmania: Evandale Junction, with *Ectatomma metallicium* (A. M. L.). South Australia: Adelaide, 1935, in moss (H. W.); National Park, Belair and Long Gully in moss, September, 1935, (H. W.).

Remarks—There is no doubt that Banks' *Cyrtolaelaps femoralis*, the single specimen of which is in the collection of the South Australian Museum, is erroneously placed. A comparison of Banks' figures, especially of the sternum and epigynium, with the present figures from new material will prove this.

Genus **Austrogamasus** nov.

Neoparasitidae—Female with entire dorsal shield which postero-laterally underlaps the venter. Legs long and slender; tarsi with short caruncle and paired claws. Fork on palpal tarsus three-pronged. Epistome rounded with numerous short spines or teeth. Prae-endopodal and fourth endopodal shields free. Sternum with three pairs of setae. Metasternal shields absent, but represented by the usual seta and pore. Genito-ventral shield elongate, posterior margin squarish and adjacent to anal shield, with only a single pair of setae definitely on the shield. Male unknown.

This genus ventrally closely resembles *Gymnolaelaps* of the Laelaptidae and the species might almost be placed there but for the three-pronged fork on the tarsus of the palpi.

Austrogamasus gracilipes (Banks 1916)

(Fig. 10, A-E)

Cytolaelaps gracilipes Banks 1916, Trans. Roy. Soc. S. Aust., **40**, 228.

Female—Shape oval, but tapering rapidly posteriorly. Colour, deep orange-brown. Strongly chitinised. Length 920 μ, width 635 μ. Dorsal shield covering entire dorsum and, behind coxae IV, underlapping the venter; dorsal setae (fig. 10, A) long, and fine, 65 μ. Venter; tritosternum with short base, prae-endopodal shields present, but lightly chitinised and indistinct; sternal shield barely extending to middle of coxae III, with three pairs of setae; metasternalia only represented by a seta and pore; fourth endopodal shields free and distinct; epigynial and ventral shield coalesced, with a single pair of setae on level of posterior edge of coxae IV, elongate with only slightly convex sides, and reaching apex of anal shield, with truncate end, there are three other pairs of setae which are hardly on the shield; anal shield sub-rotund with anus in posterior half and the usual circumanal setae; behind coxae IV and on each side of genito-ventral shield are three small inguinalia, the outer ones of which are elongate; peritremal shields narrow and posteriorly only reaching coxae IV.

Mandibles as in fig. 10, D. Epistome rounded medially, more flattened laterally, with small fine teeth extending right across.

Loc. (two females)—Victor Harbour, South Australia, May, 1939 (J. S. W.).

Recorded by Banks 1916 (as *Cyrtolaelaps*) from Sydney and Liverpool, New South Wales, and from Lal Lal, Victoria, as in association with the ants *Ponera*

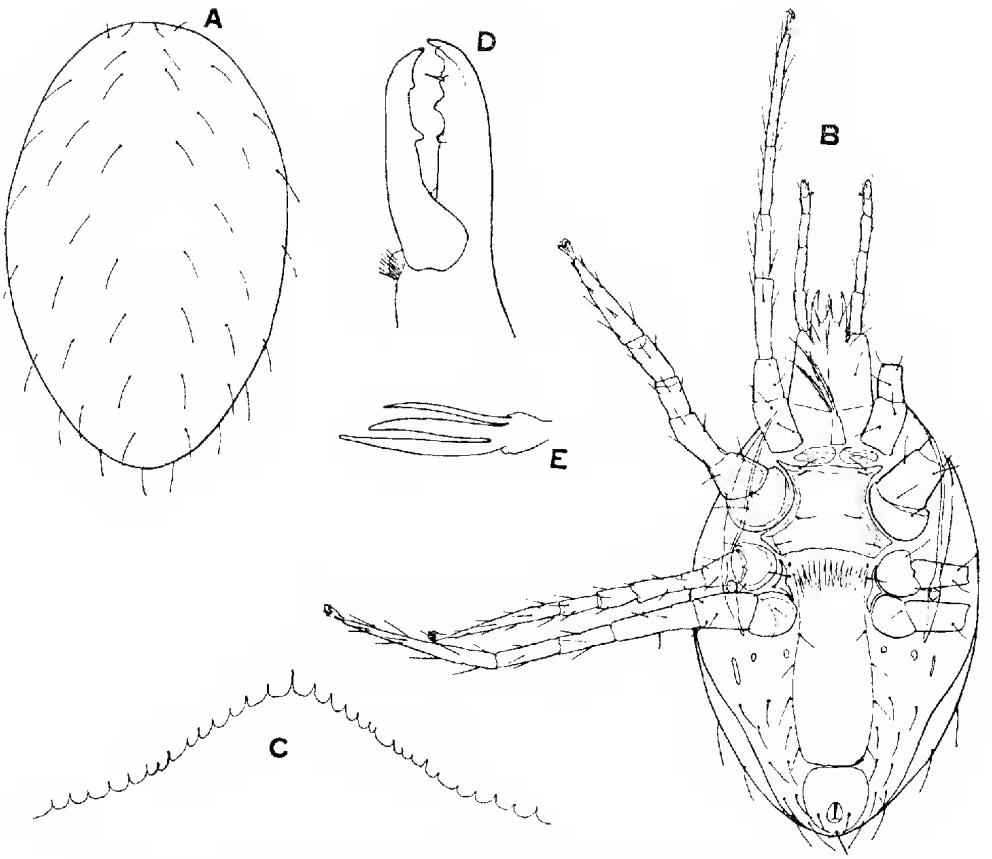

Fig. 10, A-E *Austrogamasus gracilipes* (Banks): A, dorsal; B, ventral, C, epistome; D, mandible; E, fork of palpal tarsus.

lutea, Camponotus nigriceps, Ectatomma metallicum, and *Polyrachis hexacantha,* collected by A. M. Lea.

Family GAMASOLAELAPTIDAE Oudemans 1939

Zool. Anz., 1939, 126, (1-2), 22. nom. nov, for Metaparasitidae Oudemans, 1906.

As in Neoparasitidae, but with two dorsal shields.

In this family Oudemans (*loc. cit.*) includes the genera *Digamasellus* Berl. 1903, *Euryparasitus* Ouds. 1901, *Gamasodes* Ouds. 1939, *Gamasolaelaps* Berl. 1903, *Halolaelaps* Berl. et Trt. 1889, and *Rhodacarellus* Willm. 1936.

Genus Digamasellus Berlese 1905

Redia 2, 234.

Dorsal shield divided, sternal shield consisting of fused jugularia, coxal and metasternal shields; prae-endopodal shields present (sometimes two pairs or subdivided) or ? absent; fourth endopodal shields free. Epigynial shield separated from sternal, and ventrianal with rounded anterior margin and straight posterior margin. Ventral and anal shields coalesced, large, occupying most of venter. Epistome with a single mucro or trispinous. Leg I with claws much smaller than rest and on distinct but short peduncles. Fork on palpal tarsus three-pronged. Male with calcar appendage on movable chela of mandibles, and leg II strongly armed.

Owing to lack of literature, particularly Berlese's description of the type species *Gamasus pusillus*, I am a little uncertain as to the placing of the following species in this genus, and the above generic characters are largely drawn from the material before me.

? **Digamasellus concina** n. sp.

(Fig. 11, A-M)

Colour yellow-brown, well chitinised. Length to 650 μ, width to 450 μ. Dorsal shields two, separated by a narrow suture, anterior shield with the front

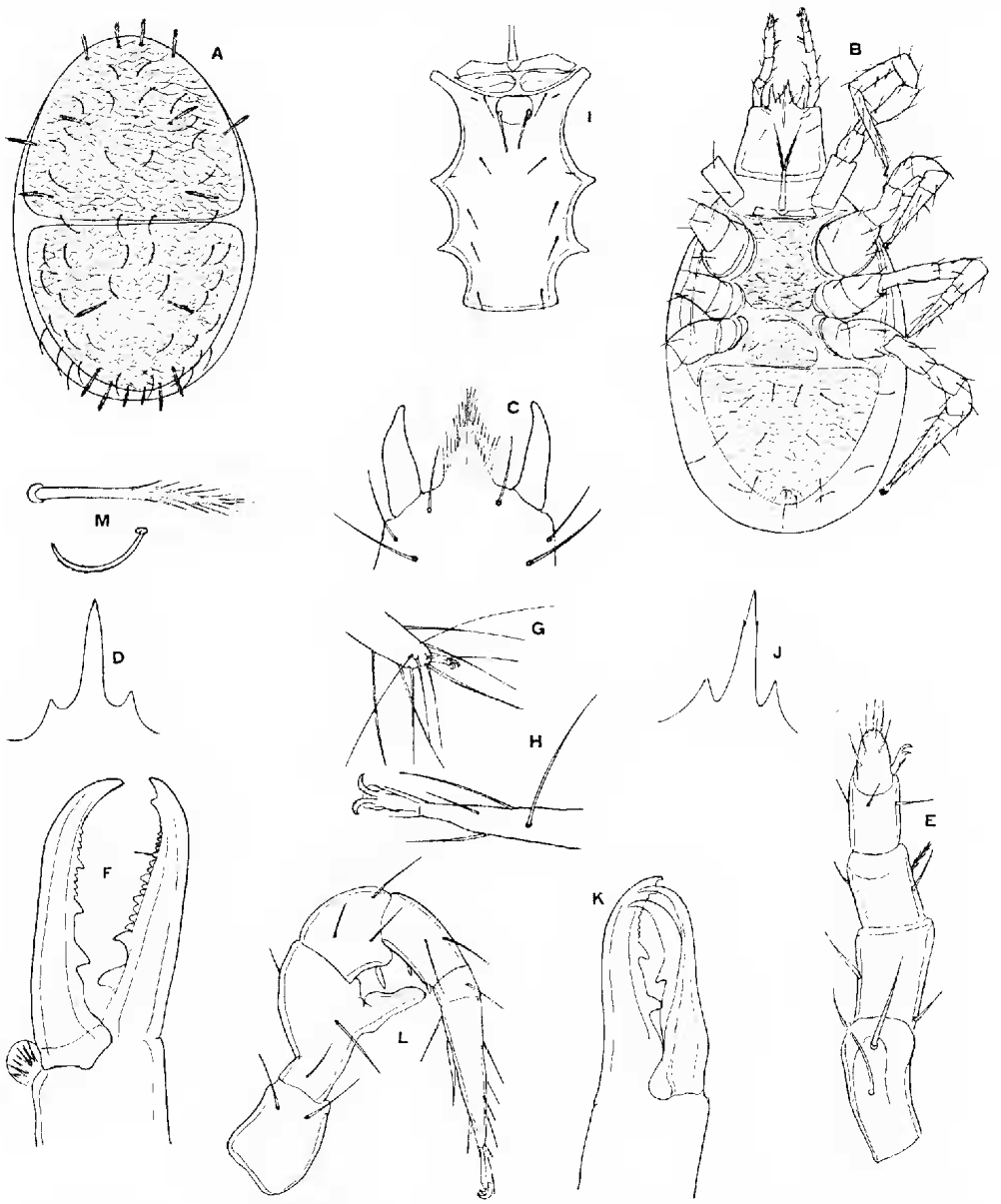

Fig. 11, A-M *Digamasellus concina* n. sp.: A, dorsum ♀ ; B, venter; C, labial cornicles ♀ ; D, epistome ♀ ; E, palp ♀ ; F, mandible ♀ ; G, tip of leg I ♀ ; H, tip of leg III ♀ ; I, sternal shield ♂ ; J, epistome ♂ ; K, mandible ♂ ; L, leg II ♂ ; M, dorsal setae

portion of its lateral margins adjacent to body margins, posterior with margins well separated from body margin, both shields with reticulations. Epistome trispinous with long median mucro and short lateral mucrones.

Female—Sternal, genital and ventrianal shields with fine reticulations. Prae-endopodal shields either divided or in two pairs, consisting of a large anterior rectangular pair, and a posterior linear pair. Ventrianal shield with 10 setae besides the adanal and postanal setae. Palpi as in fig. 11 E, femur with two long strong setae, tibia with an outer ciliated seta. Median mucro of epistome simple. Labial cornicles as in fig. 11, C. Mandibles (fig. 11 F); movable chela with three prominent teeth and a series of small teeth between apex and first tooth and between first and second teeth; fixed chela with two large basal teeth, then a series of small teeth and another large one before apex. Dorsal setae of two kinds, long straight, somewhat clavate, ciliated setae, 46 μ long, and shortly curved, only indistinctly ciliated setae 30 μ long, arranged as in fig. 11, A. Legs I 585 μ, II 420 μ, III 410 μ, IV 500 μ long (fig. 10, G, H).

Male—Very similar in dimensions and dorsal shields to female. Epistome with median mucro apically tridentate. Mandibles; movable chela with calcar process free in apical half, with a single median tooth; fixed chela with a sub-basal and a median large tooth, then a series of fine teeth and a large tooth before apex. Sterno-genital shield separated from ventrianal, with five pairs of setae. Prae-endopodal shields in two pairs, the anterior pair more or less rectangular, posterior pair pear-shaped with bases inwards. Leg II thickened, as in fig. 11 L, with a strong inner subapical calcar process, and a small stout inner spine-like process on genu.

Loc.—In moss, Long Gully, South Australia, August 1938 (7 ♀♀, 1 ♂).

? **Digamasellus punctatus** n. sp.

(Fig. 12, A-L)

Colour yellowish-brown, well chitinised. Length both sexes to 700 μ, width to 400 μ. Dorsal shields two, well separated by a suture a little posterior of the middle, anterior only adjacent to body margin at the front end, posterior shield well separated from body margin but nearer apically than at sides, both shields strongly rugose with uniform, ciliated, somewhat bushy setae. Epistome with a simple median mucro, but base laterally with numerous pronounced small teeth.

Female—With only one pair of prae-endopodal shields as in fig. 12 B, sternal shield consisting of coxal, jugular and metasternal shield combined, with only indistinct reticulations; fourth endopodal shields free; ventrianal shield large, with twelve setae besides the adanal and postanal setae, laterally of the anterior corners of ventrianal shield are a pair of small elongate shields; epigynial shield as in fig. 12, B. Palpi (fig. 12, J), on tibia with two unciliated sensory setae as figured. Epistome as in fig. 11, D. Mandibles (fig. 12, C); movable chela with three large teeth, fixed chela with five teeth. Legs I 585 μ, II 420 μ, III 340 μ, IV 500 μ long, claws of I very small and on very short but distinct peduncle.

Male—Size and dimensions of shields and legs as in female. Ventrianal shield (fig. 12, E) very wide, occupying almost whole of venter. Epistome as in fig. 12, G. Only one pair of prae-endopodal shields. Mandibles (fig. 12, F); movable chela with one median tooth, and the calcar process shorter than chela and apically free, fixed chela with three teeth. Leg II (fig. 12, K) with femoral process and apical spine-like tooth or geni.

Loc.—South Australia: Adelaide, June, 1935 (1 ♀); National Park, Long Gully and Belair, August 1938 (2 ♀♀, 6 ♂♂).

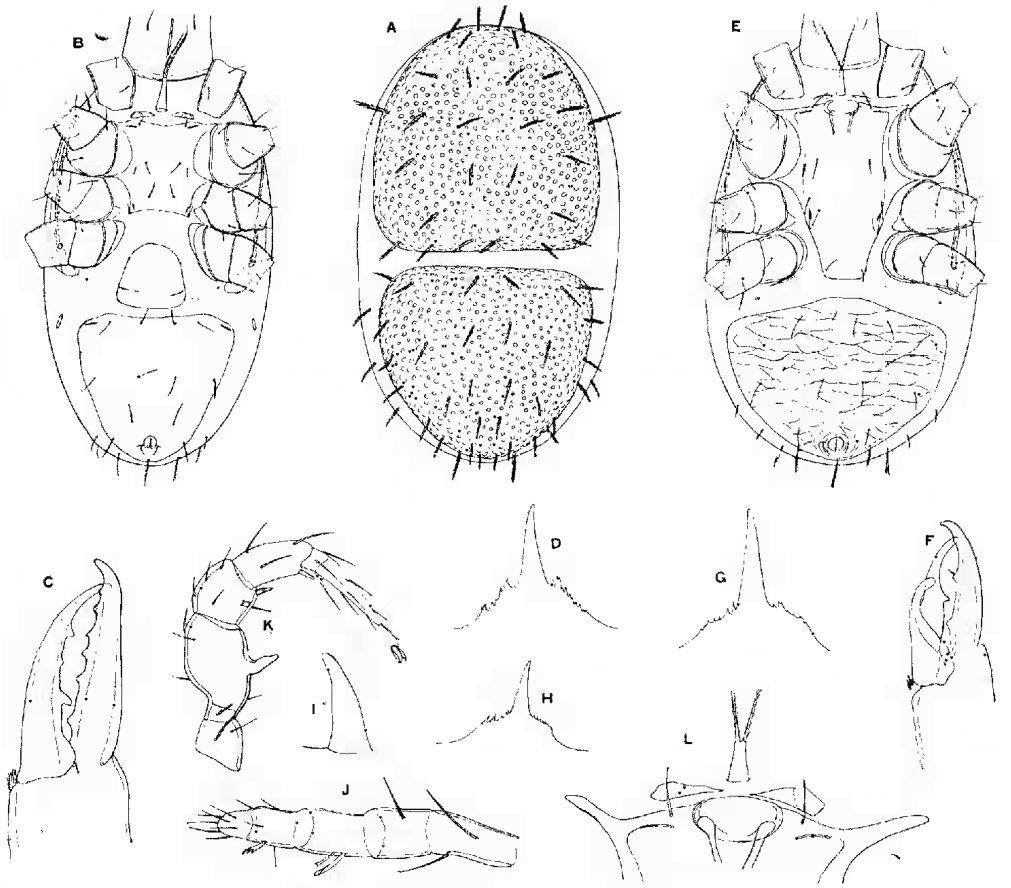

Fig. 12, A-L *Digamasellus punctatus* n. sp.: A, dorsum ♀ ; B, venter ♀ ; C, mandibles ♀ ; D, epistome ♀ ; E, venter ♂ ; F, mandible ♂ ; G, epistome ♂ ; H, same of another specimen; I, right labial cornicle ♂ ; J, palp ♂ ; K, leg II ♀ ; L, anterior end of sternal shield ♂ .

? **Digamasellus tragardhi** n. sp.

(Fig 13, A-F; 13A, A-D)

Female—Shape a rather broad oval. Length 580 μ, width 370 μ. Dorsal shield strongly chitinised, subdivided by a suture at midway. Dorsal and ventral shields with fine reticulations. Dorsal setae as in fig. 13, A, F of two kinds, some including the scapula setae rather clavate and bushy 40 μ long, the others strongly curved and scythe-shaped, 50 μ long. Prae-endopodal shields in three pairs (fig. 13, B) ; sternal shield consisting of jugular, coxal and metasternal shields coalesced; fourth endopodal shields free. Epigynial shield with rounded anterior margin and straight posterior margin, with two setae placed laterally and well forward of the posterior margin. Ventrianal shield large with 12-14 setae besides the adanal and postanal setae. Epistome five-spined with the median mucro much the longest. Mandibles as figured, fixed chela with seven teeth, movable chela with three teeth. Fork of palpal tarsus three-pronged; the lowest prong very small as in the previous species. All legs short and thick, claws of leg I small, on short but distinct peduncle; some of the dorsal setae on femora of all legs moderately stout, length of leg I 500 μ, II 420 μ, III 385 μ, IV 520 μ.

Male—As in female with relatively short thick legs. Length 585 μ, width 420 μ. Dorsal shields and chactotaxy as in female. Mandible as in fig. 13A, B,

movable chela with strong curved calcar process and overlapping tip of chela. Epistome (fig. 14, A) quinquispinous. Sternal shield (fig. 14, C) with five pairs of setae and three pairs of pores; genital foramen large, prae-endopodal shields divided into three pairs. Leg II with stout apophysis on femur and small one on genu (fig. 14, D).

Loc.—A single ♀ from moss, Adelaide, June 1935; five ♂ ♂ in moss, Bridgewate, South Australia, August 1942 (J. S. W.).

Remarks—This interesting species is doubtfully placed in this genus, from the other species of which it differs in the short thick legs, especially I, and the five-spined epistome.

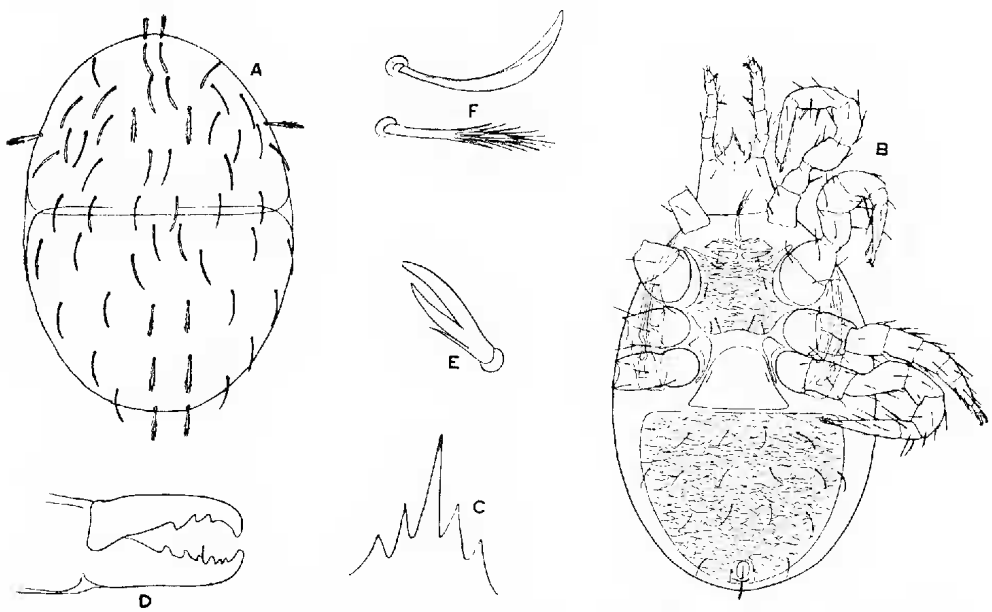

Fig. 13 A-F *Digamasellus trägärdhi* n. sp.: ♀, A, dorsum ♀; B, venter ♀; C, epistome ♀; D, mandible; E, fork of palpal tarsus; F, dorsal setae.

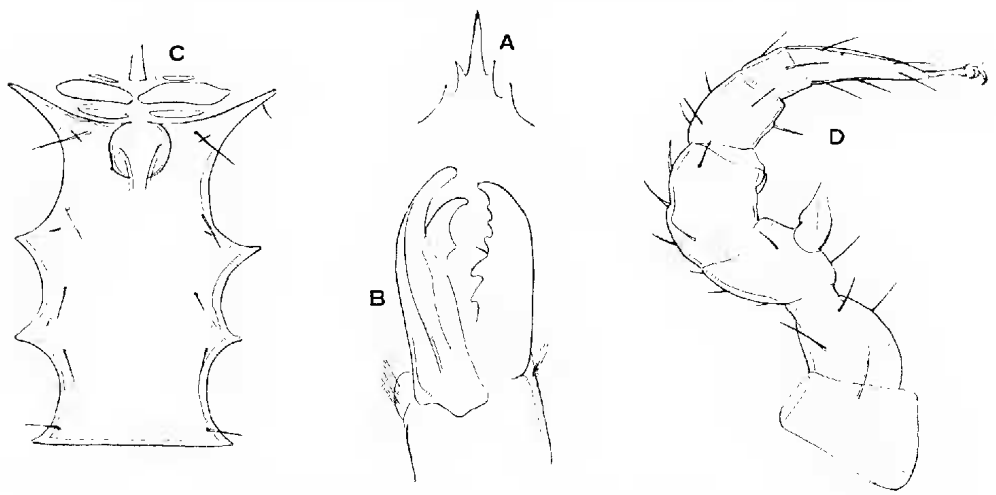

Fig. 13A, A-D *Digamasellus trägärdhi* n. sp. ♂: A, epistome; B, mandible; C, sternal shield; D, leg II.

? **Digamasellus semipunctatus** n. sp.

(Fig 14, A-B)

Description—Strongly chitinised yellowish species, shape egg-like. Length 850 μ, width 500 μ. Dorsal shields two, distinctly separate, anterior with irregular rugosities or punctures, posterior with reticulate lines. Dorsal setae on shields uniformly ciliate and clavate, 65 μ long, except the apical pair on the posterior shield which are similar but shorter. The setae outside the anterior shoulders of the posterior dorsal shield are similar to those on the shield, but all the others (cf. fig. 14, A) are short, simple and curved. Prae-endopodal shields simple;

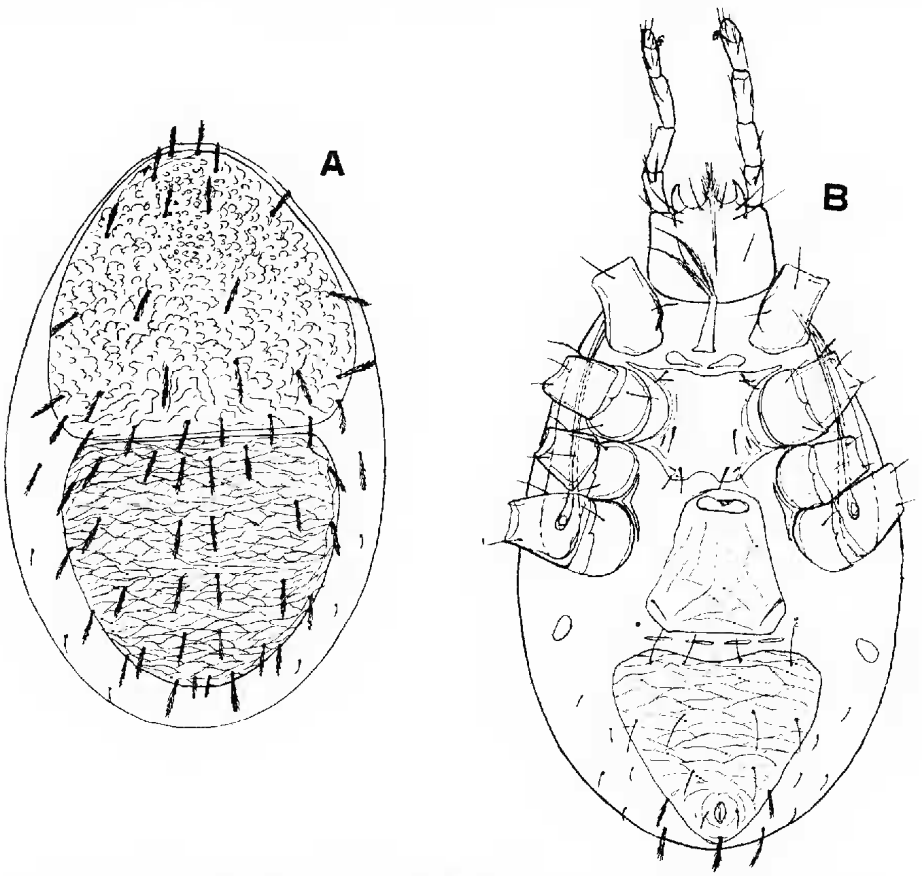

Fig. 14, A-B *Digamasellus semipunctatus* n. sp.: A, dorsum; B, venter.

sternal shield with four pairs of setae, the second and third pairs much stronger than the first and fourth; fourth endopodal shields free. Epigynial shield as in fig. 14, B with strongly chitinised sclerite on anterior wall of the vagina, with one pair of setae subpostero-lateral. Ventrianal shield large, subtriangular with ten simple fine setae and two ciliated setae, in addition to the circumanal setae, the postanal one of which is also ciliated. Between the epigynial and ventrianal shields is a transverse row of four small narrow horizontal shields, and outside of these is a pair of strong, rather large metapodial shields. The setae outside the ventrianal shield are small, fine and curved.

Legs, normal for the genus, the tarsi of leg I with a well-developed, although short peduncle.

The epistome is similar to that of *D. concina*.

Loc.—A single ♀ from moss, Bridgewater, South Australia, August 1942.

Remarks—This species is not only much larger than the others, but also differs from *D. punctatus* n. sp. (with which it agrees in having only one kind of setae on the dorsal shields) in that only the anterior dorsal shield has rugose punctures, the posterior having only reticulations. The above four species may be separated by the following key.

KEY TO THE AUSTRALIAN SPECIES OF DIGAMASELLUS

1	Dorsal shields with only one kind of setae.	2
	Dorsal shields with two kinds of setae.	3
2	Both anterior and posterior dorsal shields rugosely punctate. Size, to 700 μ. *D. punctatus* n. sp.	
	Only anterior dorsal shield rugosely punctate. Size, to 830 μ. *D. punctatus* n. sp.	
3	Legs of normal build. Epistome trispinous.	*D. concina* n. sp.
	Legs short and thick, especially I. Epistome quinquispinous	*D. trägärdhi* n. sp.

Family PACHYLAELAPTIDAE Vitzthum 1931

Result. Sci. du Voyage aux Indes. Orient. Neerlandaises 2, 1931, fasc. 5; Handbuch der Zool., 3, (2), Acari, 1931.

Here Vitzthum (loc. cit.) includes the genera *Pachylaelaps* Berlese 1888, *Onchodellus* Berl. 1904, *Megalolaelaps* Berl. 1892, *Pachyseius* Berl. 1910, *Olopachys* Berl. 1910, *Elaphrolaelaps* Berl. 1910, *Sphaerolaelaps* Berl. 1903, *Brachylaelaps* Berl. 1910, *Platylaelaps* Berl. 1904, *Paralaelaps* Trägärdh 1910, *Pachylaella* Berl. 1916, *Beaurieuia* Ouds. 1929, *Neoparasitus* Ouds. 1901.

Of these Oudemans 1939 places the last two genera in the family Neoparasitidae.

Genus PACHYLAELAPS Berlese 1888

A.M.S. ital. Rept. 1888, fasc. 51, No. 10.

Ventral shield of female coalesced with epigynial. No prae-endopodal shields. Sternal shield with four pairs of setae, *i.e.*, it consists of the fused jugular, coxal and metasternal shields, and is only slightly differentiated from the epigynial. Anal shield free. Parapodial shield large and produced beyond coxae IV, where it lies closely adjacent to the ventri-epigynial shield. Epistome with a wide apex with many teeth. In male all ventral shields coalesced. Dorsal shield entire in both sexes. Leg II thicker than the rest in both sexes, tarsus II with two stout spines; leg IV of ♂ with long flexible appendage to movable chela.

Pachylaelaps australicus n. sp.

(Fig. 15, A-K)

Broadly oval, well chitinised brownish-yellow. Length of ♀ to 900 μ, width to 590 μ; length of ♂ to 850 μ, width to 550 μ. Dorsal shield entire in both sexes, with pronounced hexagonal reticulations, with chaetotaxy as in fig. 15, A; setae 50-75 μ long. Venter ♀; all shields with pronounced reticulations, no prae-endopodal shields, sternal shield as in genus, posterior margin strongly concave, but only indistinctly separated from epigynial-ventral shield, parapodial shield large, posteriorly reaching well beyond coxae IV and its inner posterior margin overlapping lateral edge of ventri-epigynial shield, anal shield broadly triangular, outside of posterior prolongation of parapodial shield is a pair of elongate small plates as in *P. imitans* Berlese. Venter of ♂ as in fig. 15, I, legs comparatively short, and II stouter than the rest in both sexes; I slender with small tarsal claws on short caruncle, and II apically with two stout spines, and in female with two other stout ventral spines, the caruncle arising from between the apical spines; in male leg II with strong blade-like truncate calcar process on femur. Palpi

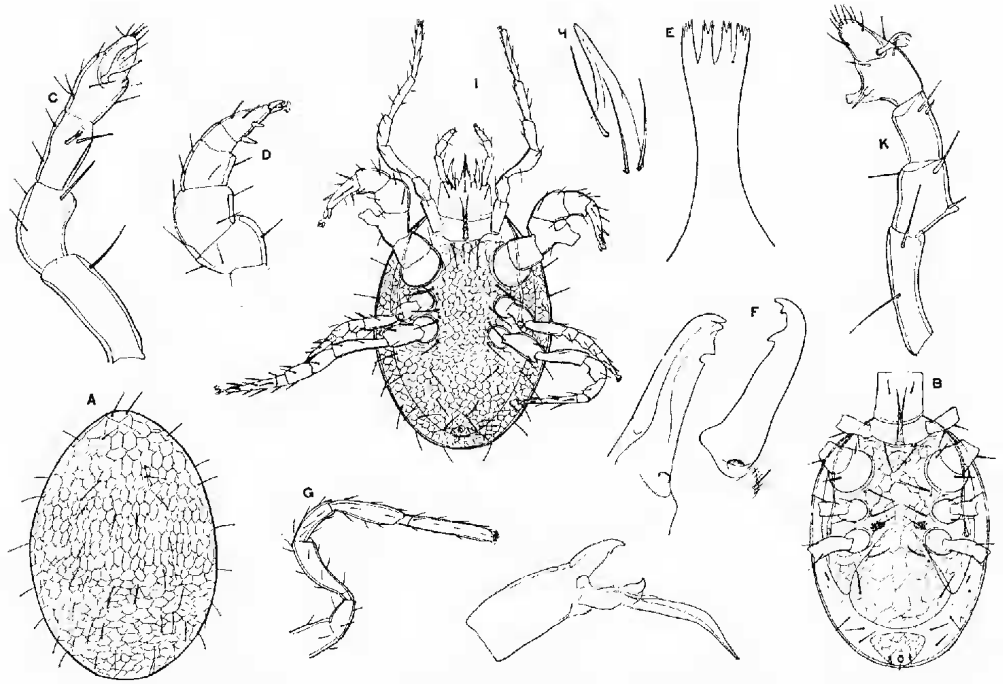

Fig. 15, A-K *Pachylaelaps australicus* n. sp.: A, dorsum ♀ ; B, venter ♀ ; C, palp ♀ ; D, leg II ♀ ; E, epistome; F, mandibular chelae; G, leg I ♀ ; H, right labial cornicle ♀ ; I, venter ♂ ; J, mandible ♂ ; K, palp of ♂ .

(fig. 15, C, K) with tarsal fork three-pronged and prominent, tarsus in ♂ also on inner side with a stout square-ended process (fig. 15, K) somewhat different in shape from *P. imitans*. Epistome in general shape typical of genus, with four major apical teeth, each of which is apically subdivided into four small teeth (fig. 15, E). Mandibles ♀ ; movable chela with two subapical teeth, fixed chela with two subapical teeth; in ♂ movable chela without teeth and with a long calcar process as in fig. 15, J, fixed chela with one recurved subapical tooth.

Loc.—In garden soil, Glen Osmond, March, 1933. Four ♀ ♀, three ♂ ♂ (H. W.).

Remarks—This species appears to be very close to *P. imitans* Berl. 1920 (Redia 15, 184), as redescribed and figured by Beier 1931 (Sitzbericht Akad. Wissenschaft, Wien: Abt. 1, Bd. 9 u. 10 Hft., 140), but differs in the structure of the epistome, the palp and leg II of the male, and in the dentition of the mandibles.

Family MACROCHELIDAE Vitzthum 1931

Handbuch der Zool., 3, (8), Acarina, 1931.

Legs I without ambulacra and claws, exceptionally with ambulacra in *Neopodocinum* Oudms. Prae-endopodal shields present or absent. Epistome variable, usually fish-tail-shaped with an anterior fork. Female sternal shield usually with three pairs of setae and two pairs of pores corresponding to the coalesced jugular and coxal shields, sometimes with four pairs of setae and three pairs of pores, *i.e.*, embracing the metasternal shields which are otherwise free; epigynial shield free, with rounded anterior margin and one pair of setae, often contiguous with the fused ventral and anal shields; ventri-anal shield usually large and occupying most of the venter with a variable number of setae. Male sternal shield with the genital opening under its anterior margin, with four pairs of

setae. Male with a calcar process on the movable chela of the mandibles and with the second leg and sometimes the fourth leg armed with processes.

In this family Vitzthum (*loc. cit.*) includes the genera *Neopodocinium* Oudms. 1902, *Podocinum* Berl. 1882, *Geholaspis* Berl.19 18, *Coprholaspis* Berl. 1918, *Nothrholaspis* Berl. 1918, *Macrocheles* Latr. 1829, *Holostaspella* Berl. 1904, *Macrholaspis* Oudms. 1931, *Prholaspina* Berl. 1918, *Gamasholaspis* Berl. 1904, *Calholaspis* Berl. 1918, *Parholaspis* Berl. 1918, *Holaspulus* Berl. 1904, *Holoclaeno* Berl. 1910, *Trichoclaeno* Berl. 1918, *Evholoclaeno* Berl. 1918, and *Trigonholaspis* Vitz. 1930.

Genus Macrocheles Latreille 1829, Berlese 1918

In Cuvier R. Anim. ed. 2, 4, 282; Berlese 1918, Redia 13, fasc. 1, 172.
= *Holostaspis* Kolenati 1857, Berlese 1887, A.M.S. ital. Rept., fasc. 44, No. 2.

As in the family; leg I not much if at all longer than body. Dorsal shield not longitudinally carinate with depressed median area, well chitinised, entire. Sternal shield with three pairs of setae. Metasternal shields free and conspicuous. Ventrianal shield large, adjacent to posterior margin of epigyial shield, with three pairs of setae besides the circumanal setae. Sternal shield without definite median transverse lines, with small reticulate lines of rugosities which are more pronounced on posterior half. Epigynial, ventrianal and dorsal shield with hexagonal reticulations. Sternal shield without porous areas.

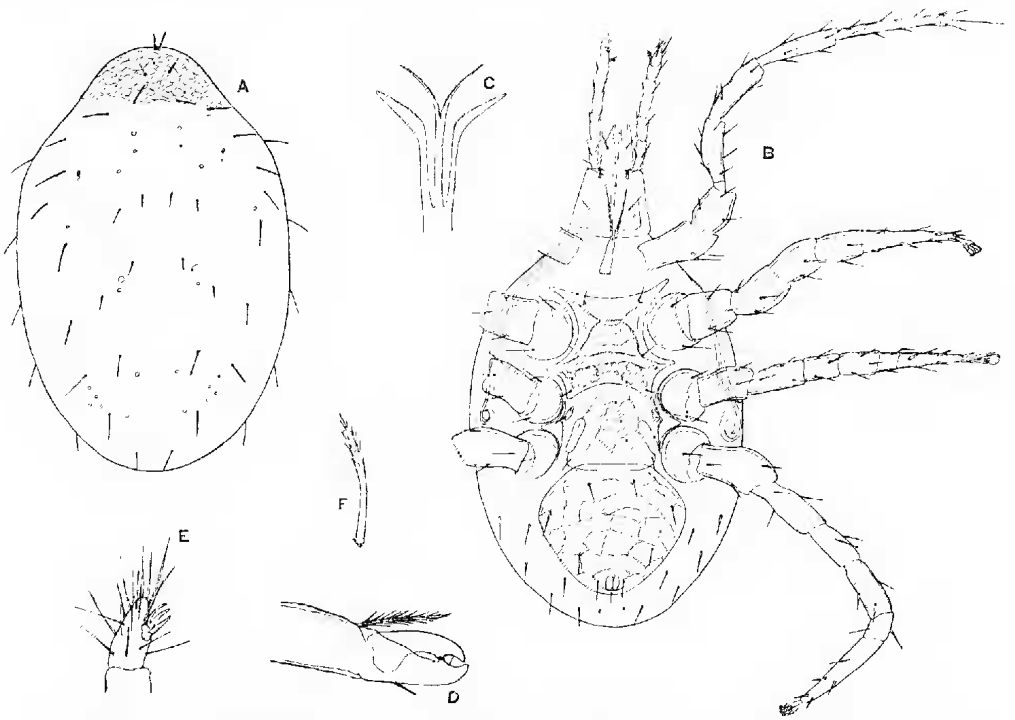

Fig. 16, A-F *Macrocheles vagabundus* v. *australis* Berl.: A, dorsum; B, venter; C, epistome; D, mandible; E, palpal tarsus; F, outer dorsal seta.

Macrocheles vagabundus Berl. 1889, var australis Berl. 1918

(Fig. 16, A-F)

Female—Dark yellowish-brown strongly chitinised. Length to 1,200 μ, width to 700 μ. Venter: prae-endopodal shields wanting; sternal shield with the median transverse and oblique lines represented by small rugosities, posterior

half with rather stronger rugosities (fig. 16,B); epigynial and ventrianal shields with fine reticulate hexagonal lines; endogynium with the usually rod-like lateral sclerites; ventrianal shield large, subpentagonal, with three pairs of setae, besides the adanal and postanal setae; fourth endopodal shields free. Epistome as in fig. 16,C. Mandibles with only a single subapical tooth on each chela. Legs II and IV somewhat stouter than I and III; I 820 μ, II 670 μ, III 750 μ, IV 1,080 μ long. Dorsal setae arranged as in fig. 16, A, all except the two median transverse rows of 4, 40 μ long and apically penicillate (cf. fig. 16, F), median ones fine, pointed, and 20 μ long.

Loc.—A fairly common species generally found attached to flies, principally species of *Musca,* as in all the following records:—New South Wales: Upper Orara *via* Karangi, April, 1937 (M. A. H.); Tweed River, February, 1928 (T. F. F.); Sydney, 1909 (T. H. J.); Bathurst, May, 1942. Queensland: Brisbane, May, 1941; Bustard Head, June, 1942. It was originally recorded by Berlese from "Sydney, Australia."

Remarks—In most species of *Macrocheles* and allied genera, males are extremely rare, and all my material is of the female sex.

In the male as originally described by Berlese the femora of leg II and the trochanters of leg III and IV are shown as armed with processes and tubercles.

Macrocheles coprophila n. sp.

(Fig. 17, A-E)

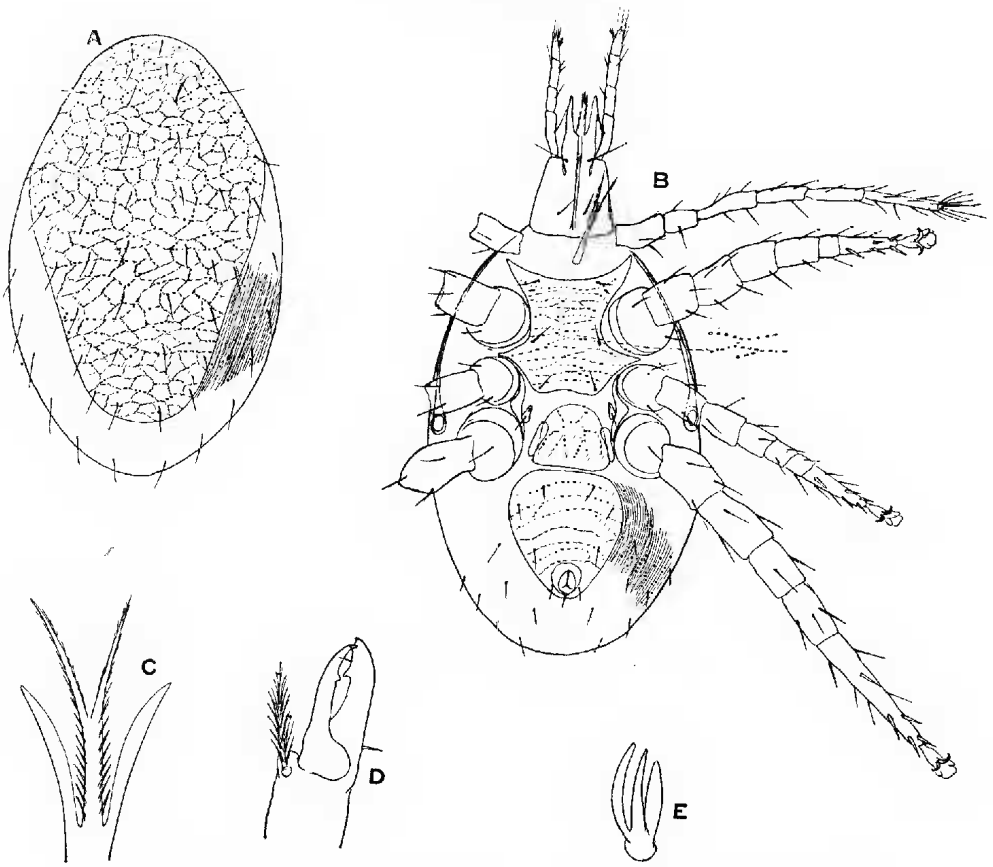

Fig. 17, A-E *Macrocheles coprophila* n. sp., ♀ : A, dorsum; B, venter; C, epistome; D, mandible; E, palpal fork.

Female—Yellowish-brown, moderately chitinised. Length to 1,000 μ, width to 700 μ. Venter: prae-endopodal shields wanting. Sternal shield without the median transverse and oblique lines but with a number of irregular transverse rows of minute rugosities (cf. fig. 17, B). Epigynial and ventrianal shields with similar lines of minute rugosities; endogynium with the usual lateral sclerites. Ventrianal shield only moderately large, about half as wide again as the base of the epigynial shield, subtriangular and longer than wide and with three pairs of setae besides the circumanal setae. Fourth endopodal shields free. Metasternal shields also free and conspicuous. Mandibles (fig. 17, D) with one subapical tooth on each chela. Epistome as in fig. 17, C.

Dorsal shield with fine hexagonal reticulations and setae as arranged, uniform and simple, 40 μ long; shield not completely covering abdomen, tapering for the posterior two-thirds; the cuticle outside of the shield longitudinally and finely striated. Legs I 780 μ, II 720 μ, III 750 μ, IV 1,000 μ long.

Loc.—Two females from manure heap, Bathurst, New South Wales, May 1932 (S. L .A.).

Genus NOTHRHOLASPIS Berlese 1918

Redia, 1918, 13, fasc. 1, 169.

Sternum variously and densely rugose, rugosities not reduced, transverse median line sometimes obsolete; porous areas sometimes present. Body and legs with scaly secretions. Dorsal setae penicillate.

NOTHRHOLASPIS *?* MONTIVAGUS Berlese 1887

Holostaspis montivagus Berl. 1887, A.M.S. ital. Rept., fasc. 44, No. 4.

(Fig. 18, A-E)

Strongly chitinised dark-brownish species, the body and legs generally covered with a scaly secretion. Female: length to 1,400 μ; width to 830 μ. Venter: prae-endopodal shields wanting; sternal, epigynial and ventrianal shields strongly rugose with the rugosities in clusters (fig. 18, B); sternal shield with three pairs of setae and two pairs of pores, reaching middle of coxae IV; metasternal shields free and distinct, but almost enclosed by the angle of sternal, epigynial and fourth endopodal shields. Ventrianal shield with a flattish anterior margin and then almost evenly rounded, about as wide as long, with three pairs of setae besides the circumanal setae. Fourth endopodal shields free. Epistome as in fig. 18, C. Mandibles (fig. 17, D), each chela with two blunt teeth. Legs, I 1,000 μ long, II 950 μ, III 950 μ, IV 1,400 μ. Dorsal shield entire, with fine reticulate hexagonal lines, except in the middle where the rugosities are as in fig. 18, A; setae mostly with coarse ciliations (fig. 18, E), 90 μ long, the median setae 120 μ long and not or only indistinctly ciliated.

Loc.—Common under boards and rubbish, etc., on cultivated land. South Australia: Glen Osmond, May 1932 (one specimen),; Adelaide, July 1942 (many female specimens). Western Australia: Perth, February 1932 (one specimen).

Remarks—As only Berlese's brief description and figures are available to me, the identification of my material with this species is somewhat uncertain. It closely resembles it in the ventral and dorsal shields and the mandibles, but appears to differ in that the arms of the fish-tail portion of the epistome are not anteriorly ciliated as Berlese' figures.

Genus GEHOLASPIS Berlese 1918

Redia 1918, 13, fasc. 1, 145.

As in *Macrocheles* but with five pairs of setae on the ventrianal shield besides the circumanal setae.

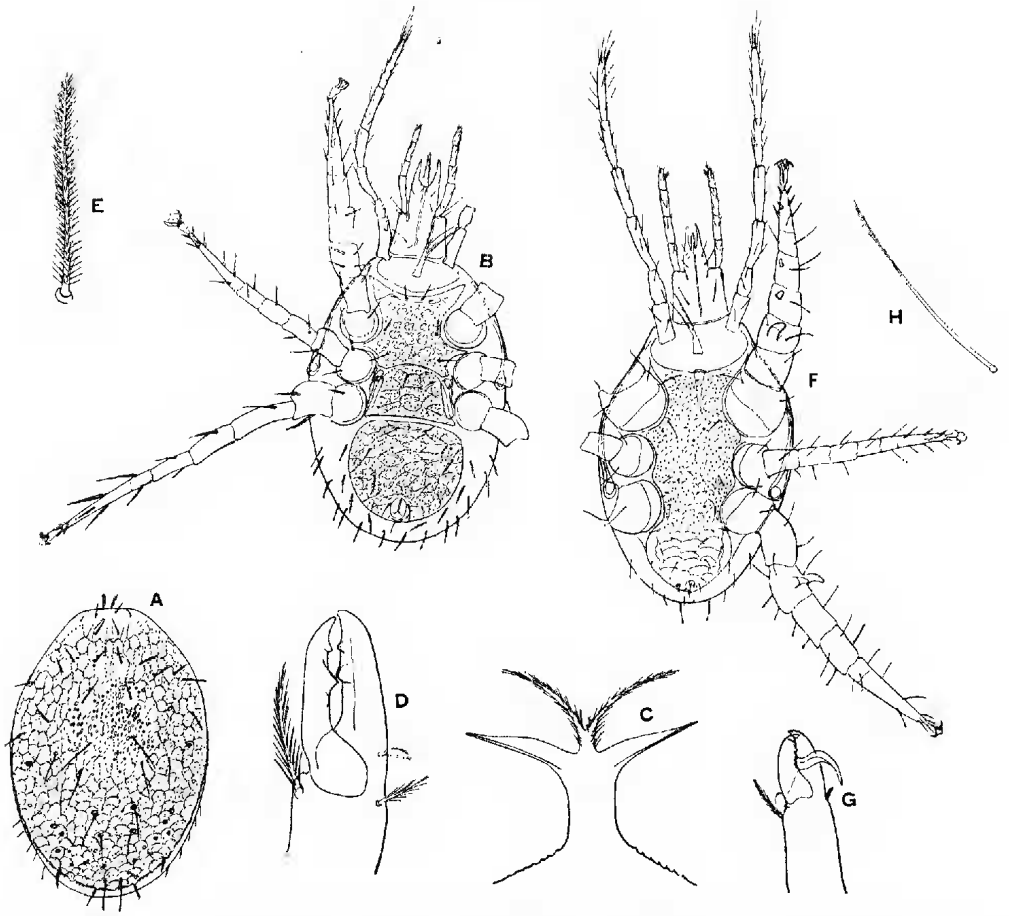

Fig. 18, A-E *Nothrholaspis ?montivagus* Berl.: A, dorsal view ♂ ; B, ventral view ♀ ; C, epistome; D, mandible; E, lateral dorsal seta. F-H *Geholaspis* sp.: F, ventral view ♂ ; G, mandible; H, dorsal seta from posterior end.

GEHOLASPIS sp.

(Fig. 18, F-H)

Male—Length 900 μ. width 420 μ. Sternal, epigynial and ventrianal shields all coalesced, sterno-epigynial portion with four pairs of setae and irregularly finely rugose, ventrianal portion with five pairs of setae besides the adanal and postanal setae. Dorsal shield and epistome unobservable owing to damage, but dorsal setae mostly simply, about 30 μ long, with posteriorly a pair, apically ciliated and about 40-50 μ long (fig. 18, A). Mandibles as in fig. 18, G, fixed chela with stout bent process. Legs, II and IV much stouter than I and III, I 580 μ long, II 500 μ. III 420 μ, IV 850 μ; leg II with stout, short, curved process on femur, and a smaller one on genu and on tibia, leg IV with a pair of processes on femur.

Loc.—A single male specimen taken by Mr. S. L. Allman from a dahlia bulb at Bathurst, New South Wales, November 1932.

Remarks—Owing to having only a single male and because the preparation became seriously damaged during study, it is not possible at present to place this species other than in the genus.

Genus **Euepicrius** nov.

Broadly rounded. Dorsum with a narrow suture beyond the middle. Anterior legs long, without ambulacra or claws in both sexes. Palpal tarsus with three-pronged fork. Epistome triangular with median short broad triangular tooth and laterally three to four small short teeth. Mandibles of ♂ with long slender calcar process on fixed chela. Legs II of ♂ armed. Venter: no prae-endopodal shield; sternum with four pairs of setae and three pairs of pores; epigynial free with rounded anterior and straight posterior margin, with one pair of setae; ventrianal shield occupying the whole of the venter and only indistinctly separated from the parapodial shields. Peritreme long and corrugated. Type *Euepicrius filamentosus* n. sp.

Euepicrius filamentosus n. sp.

(Fig. 19, A-J)

Description—Broadly rounded species, with the dorsal shields strongly rugose, and strongly chitinised, yellow to brown in colour. Length, ♀ 580 μ, ♂ 500 μ; width ♀ 420 μ, ♂ 420 μ. Dorsally with long filamentous setae (fig. 19, A) reaching ca. 100-120 μ, posteriorly with a pair of stout ciliate setae 70 μ. Legs, I longer than body, antenniform, ♀ 750 μ long, ♂ 720 μ, tarsus without claws; II ♀ 500 μ, ♂ 350 μ, femur with long calcar process; III ♀ 480 μ, ♂ 350 μ; IV ♀ 580 μ, ♂ 550 μ. Epistome (fig. 19, E, F) similar in both sexes. Labial

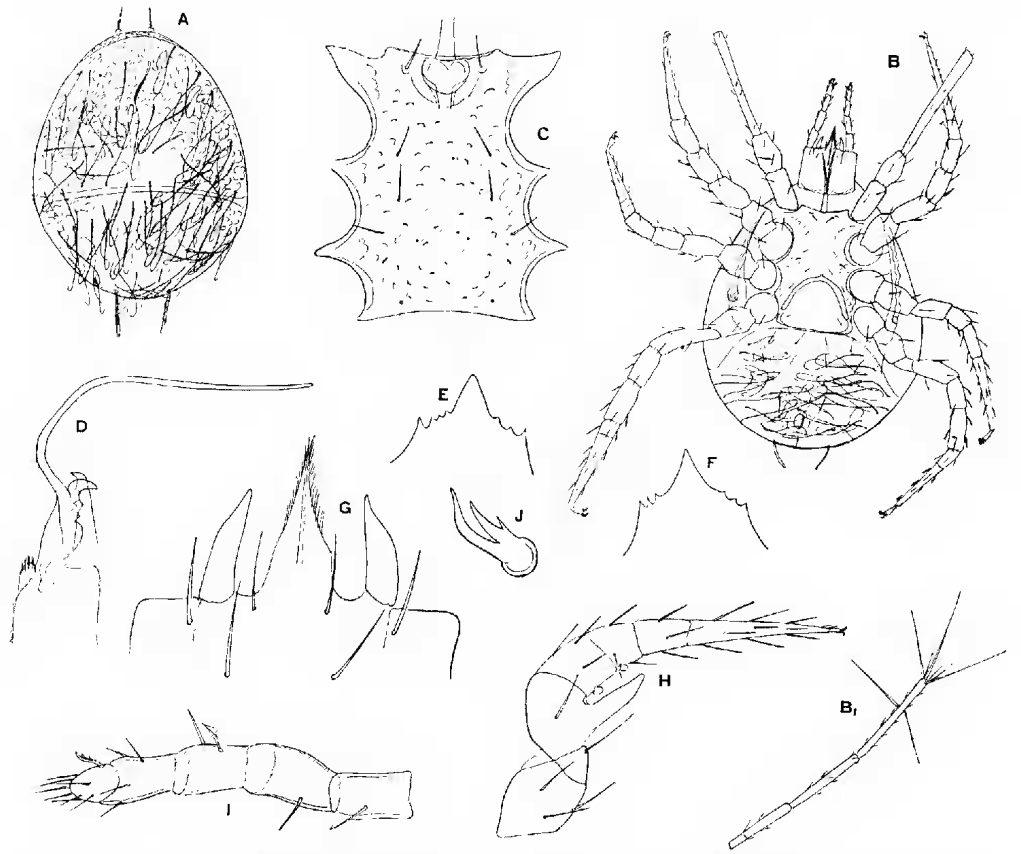

Fig. 19, A-J *Euepicrius filamentosus* n. g. et n. sp.: A, dorsal view ♀; B, ventral view of ♀; B_1, end segments of leg I; C, ♂ sternal shield; D, ♂ mandible; E, epistome ♂; F, epistome ♀; G, labial cornicle; H, ♂ leg II; I, palp; J, fork of tarsus of palp.

cornicles as in fig. 19, G. Palpi with sensory spathulate seta on genu. Mandibles as in fig. 18, D, fixed chela of ♂ with a long, slender bent process.

Venter: ♀ (fig. 19, B) no prae-endopodal shields, sternal shield with four pairs of short setae, the three anterior pairs situated well towards the medial line, and representing the fused jugular, coxal and metasternal shields; fourth endopodal shield not visible; genital shield round anteriorly, straight posteriorly with one pair of setae; ventrianal shield large, occupying whole of venter and separated from the parapodial shields only by a fine oblique line: ♂ sternal shield as in fig. 19, C. Ventrianal shield in both sexes with long filamentous setae.

Loc.—South Australia, in moss, Glen Osmond, June 1933, July 1935; Long Gully, August 1938. Also one female from Waimamaku, New Zealand, October 1938 (E. D. P.).

Remarks—The generic name is given on account of the, at first glance, superficial likeness to the genus *Epicrius,* especially in the long anterior legs without claws. In the presence of a distinct peritreme, three-pronged palpal fork and the structure of the ventral shields it must be placed in the family Macrochelidae.